STEEL
The Metalworking Weekly
A PENTON PUBLICATION
SEPTEMBER 18, 1961

Highly reactive, with production limited to pounds per day . . .

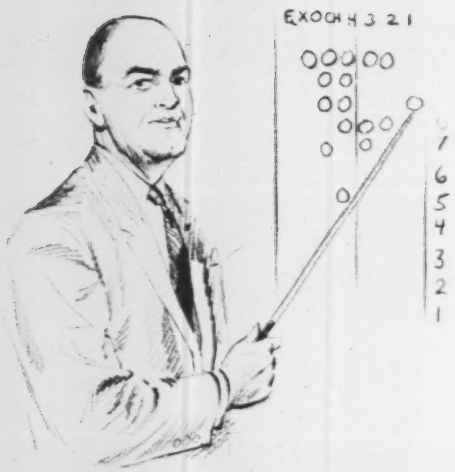
Cesium Picked for Stardom in Space . . . 139

Capital Spending Holds Upward Trend 53

Vacuum Processes Set for Boom 100

How to Pick Adjustable Speed Drives . . 104

METALWORKING WEEK—PAGE 17
COMPLETE CONTENTS—PAGE 19



NUMERICALLY CONTROLLED DRILLING...

A short cut to a fast payoff

by Gordon Deagle

Engineer, Bore-Matic Division
The Heald Machine Company

Drilling has long been one of the simplest and most universally used operations in the machine tool field. Furthermore, of the various numerically controlled machines, the *drill* is one of the quickest to return its cost through resultant savings.

This is due largely to the fact that the increased accuracy required in most of today's drilling operations has heretofore been met by building expensive jigs and fixtures. And often these special fixtures have been made obsolete due to design changes long before they have repaid their cost through savings.

Many people think of numerical control only in terms of very high production. But with drilling this is not the case at all.

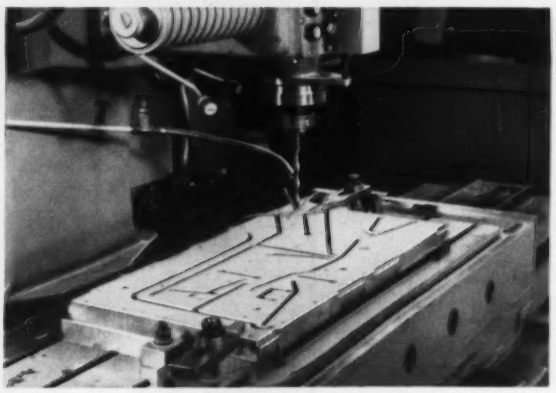
The HEALDRILL, a high-precision automatic tape-controlled drilling machine, has been profitably applied on many short run jobs involving frequent changeovers. In fact operating experience in our own drill department proves that the cost savings are even greater where small lots of many different parts are involved than on high production jobs where the expense of special jigs and fixtures might be recovered before obsolescence.

A case in point is the Heald hydraulic valve plate illustrated here in a setup on the machine. A mating pair of these plates forms a multi-channel valve panel which requires 54 drilled holes, 44 drilled and counterbored holes, and 75 holes that are drilled, reamed and tapped. All of these operations are now done on the numerically-controlled HEALDRILL and all cycle functions are fully automatic except for tool changes. Based on manufacturing in lots of 10, with a total of 200 before obsolescence of the part, the HEALDRILL method has saved $39.90 per panel over the jig method. This is a total saving of $7,980.00 on one job alone—almost 20% of the entire cost of the machine!

Hole positioning, feeds, speeds, rapid traverse and full depth limits, and drilling or tapping cycle are selected by the tape and hence are completely independent of the operator's skill, accuracy or speed. Tool changes, when required, are indicated by the machine and can be made in a matter of seconds. And total floor-to-floor time can be reduced by as much as 50 per cent. Changeover to another job requires no setup time except that required to insert a new tape in the control unit and locate the part on the table.

Preparation of the control tape for a new part is fast and relatively simple. With a HEALDRILL, sample and pilot lot production can be accomplished in days instead of weeks, and at minimum cost.

HEALDRILL in operation in drill department of The Heald Machine Company in Worcester, producing precision drilled, bored, counterbored, reamed and tapped parts for other Heald machines.



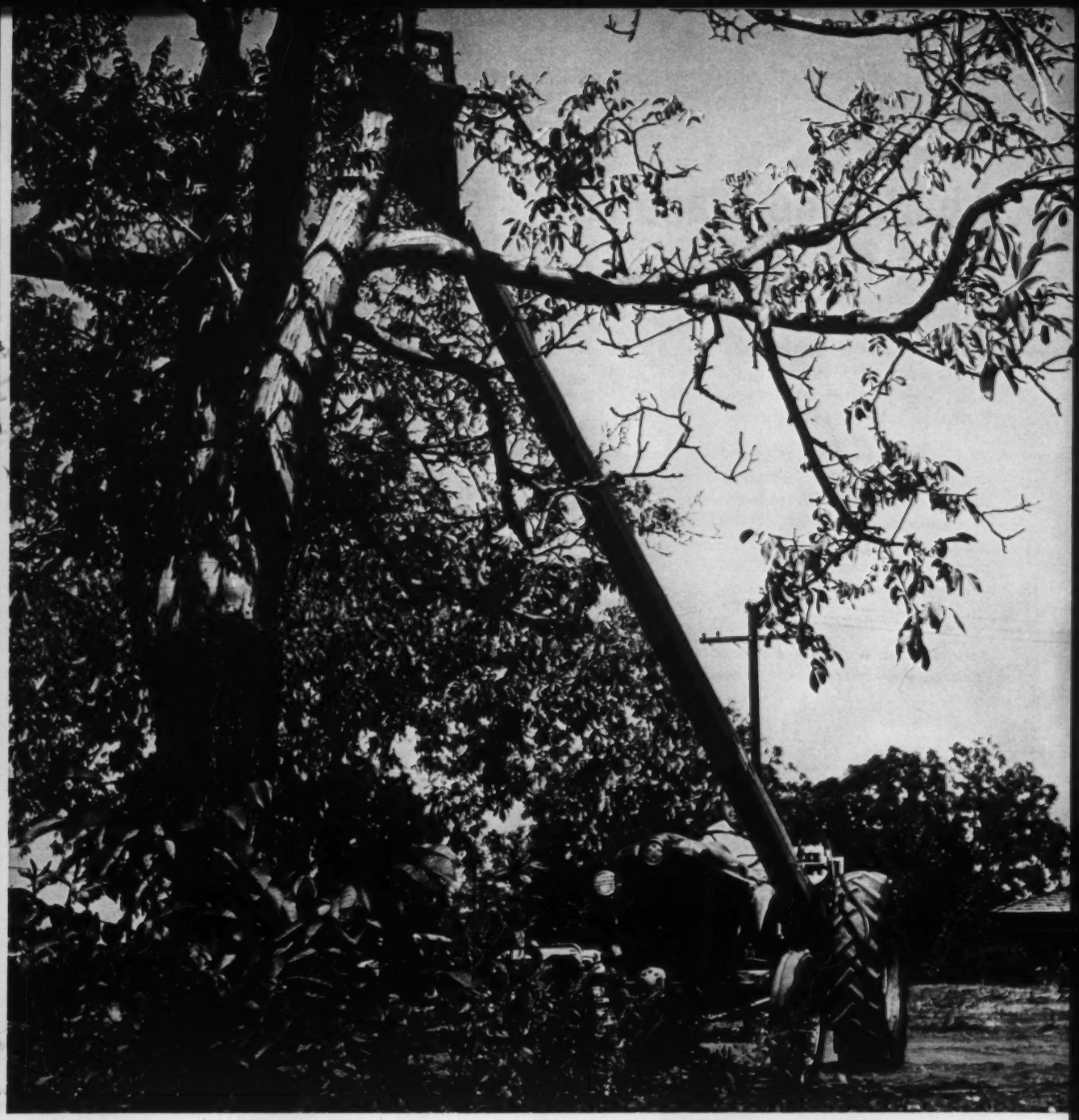
Hydraulic valve panels with 173 holes are precision drilled, counterbored and tapped on the HEALDRILL, at a saving of $39.90 per panel.

For complete information on the numerically-controlled HEALDRILL contact your Heald engineer—or send for a copy of Bulletin 2-20-48.

It Pays to come to Heald

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.
Worcester 6, Massachusetts



It takes arms of sheet steel for this fruit-tree shakedown

They don't pick fruits and nuts nowadays. Instead, a sturdy tractor-mounted boom reaches up, clasps an 8-inch limb in a cushioned grip, and shakes down every walnut, plum, or cherry.

It's a job made to order for strong, lightweight sheet steel. This hydraulic boom, made by Gould Bros., Inc., San Jose, California, is made from 10-ga sheets of Bethlehem's Mayari R high-strength, low-alloy steel. Because of its high yield point, Mayari R sheet steel reduces deadweight while maintaining strength and impact resistance in the boom.

Whatever your product, it makes sense to design and work with sheet steel. Bethlehem can furnish the sheets you need for the job, in a wide variety of gages, tempers, and surface finishes. Let's talk it over soon. Our nearest sales office will give you prompt assistance.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

Steel
for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL

which type crane is right for your yard?

The answer depends on many things: Lift, reach, and mobility requirements . . . duty-cycle . . . yard lay-out . . . overall costs . . . to name just a few. Proper evaluation calls for careful study.

You can count on AMERICAN for *experienced and unbiased help* in these matters. The reason is quite simple. *Only* AMERICAN builds *all nine** basic types of yard-crane equipment. Add to this our nearly 80 years of experience, and you see why it's good judgment to call in your AMERICAN representative before you buy. Capacities 12½ tons and up.

*SELF-PROPELLED ● CRAWLER ● LOCOMOTIVE ● TRUCK-MOUNTED
PEDESTAL ● REVOLVER ● GANTRY ● DERRICKS ● BULK UNLOADERS

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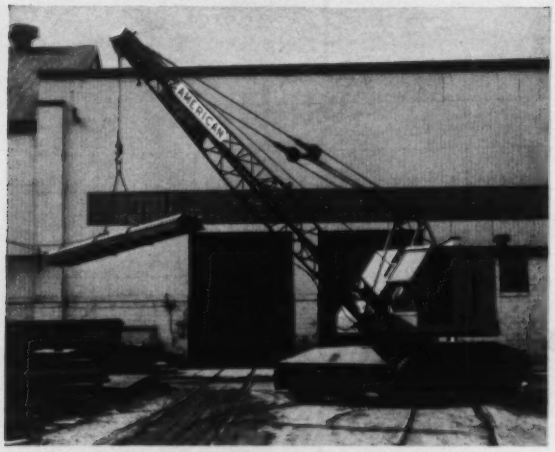
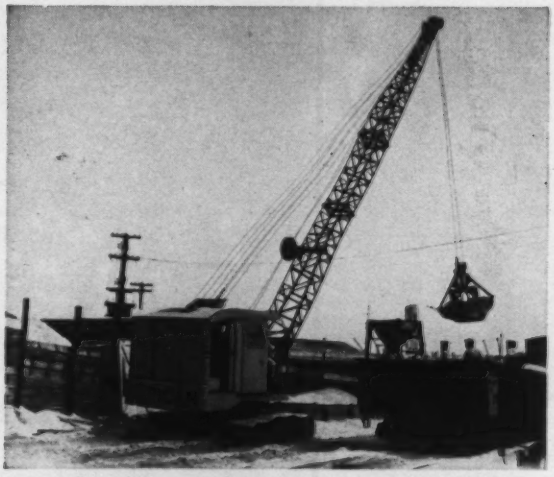
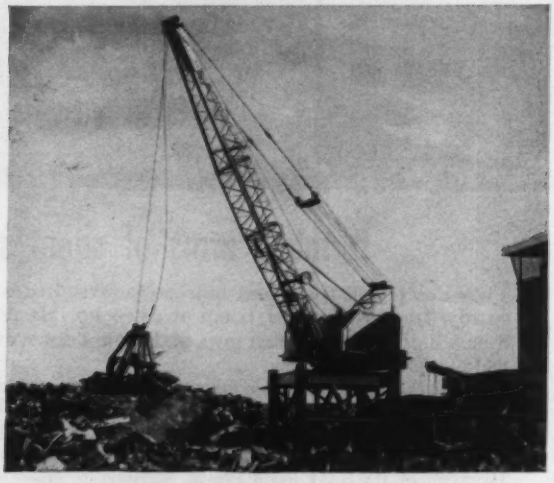


SELF-PROPELLED cranes travel and work anywhere — indoors, outdoors, at scattered locations.



CRAWLER cranes offer high stability in unimproved yard areas . . . make tight spot turns in close quarters.

LOCOMOTIVE cranes are highly efficient for continuous, heavy-duty loading. Ability to act as a switcher facilitates car spotting for loading and unloading.



SPECIAL-PURPOSE cranes, standard or custom-engineered, are frequently your answer to lowest-cost materials handling. We offer you *unbiased* recommendations for every need.

CC-743

Gary adds fifth Wean Line to step up hot rolled strip pickling capacity

United States Steel Corporation recently installed this new Wean pickling line to give its Gary, Indiana plant increased capacity in its pickling department. The new line incorporates modern design features that make higher operating speeds possible without increasing the physical length of the pickling tanks.

This has been principally accomplished through the addition of a secondary scale breaking function, performed by a temper mill and two bridles. Another factor in increasing speed is the advance coil preparation station which trims end scrap before coils are fed into the line. In combination, the design improvements give the Gary No. 5 line entry speeds up to 2,000 fpm and pickling tank section speeds to 1,000 fpm. Entering coils of 62″ O.D. and 25,000 lbs. maximum can be built to 78″ O.D., 60,000 lb. coils.

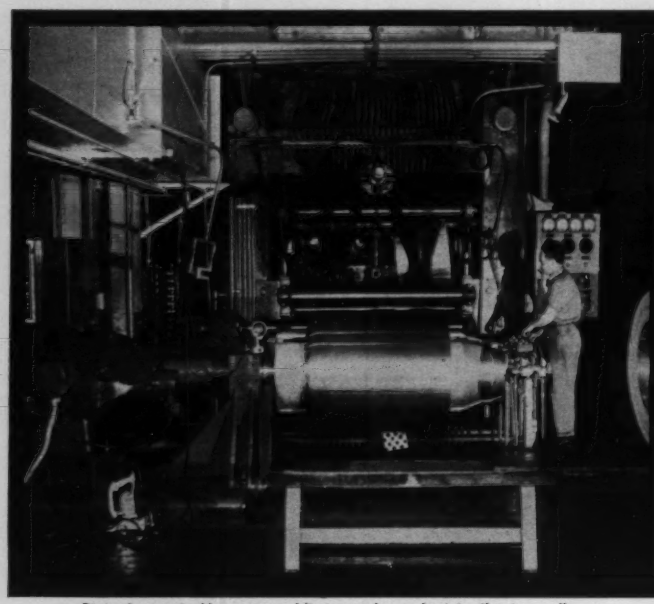
This ultra-modern installation is one of the 85 pickle lines Wean has designed to serve the steel industry. It represents over 30 years of Wean's engineering experience in developing high-speed coil processing lines that serve every major American steel manufacturer—an unequalled background of "creative engineering" to serve you.

WEAN

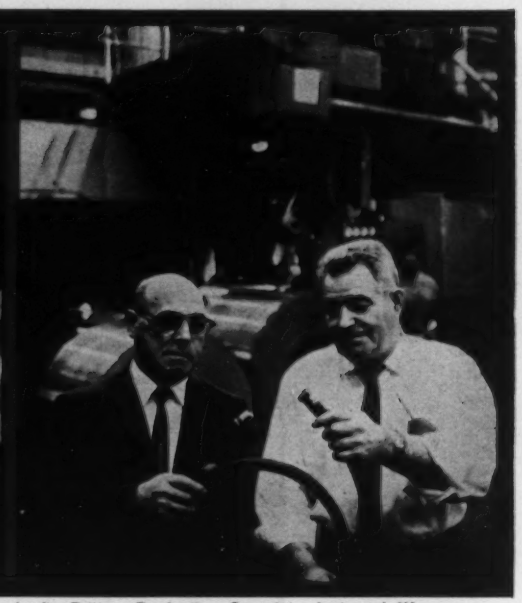
THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

Flexible Aeroquip Hose and Detachable Fittings Solve Difficult Routing Problem On Rolling Mill

...Reports The Dow Metal Products Company, Jackson, Michigan



Sixty Aeroquip Hose assemblies supply coolant to the top roll, another sixty to the bottom roll on this aluminum sheet rolling mill, at The Dow Metal Products Company.



Leslie Britton, Production Superintendent, and Warren Galapoo, Maintenance Superintendent, specified Aeroquip Hose and Reusable Fittings.

In processing aluminum roll stock, The Dow Metal Products Company, a Division of The Dow Chemical Company, reduces alloyed aluminum to as little as .006″ thickness. One hundred twenty Aeroquip 2556-10 Hose Assemblies, installed two years ago, solved routing problems in carrying pure mineral oil coolant to spray nozzles on this machine. Aeroquip Hose Lines are also specified throughout the entire plant to supply lube oil to bearings and carry high pressure hydraulic fluids.

Warren Galapoo, Maintenance Superintendent, states: "I don't know how we could solve certain problems if we didn't have flexible hose." Aeroquip Fittings help avoid downtime and reduce replacement costs because all fittings can be reused over and over again.

Let your Aeroquip Distributor, a fluid line specialist, help solve your hose and fittings problems. He is listed in the "Yellow Pages" under "Hose." Ask him for a copy of Industrial Catalog 205, or write us.

Bulk Aeroquip Hose can be cut to length and installed on the job without special tools. Fittings can be used again and again.

Aeroquip

Fast Worker

The other day a Cessna 310, owned by Industrial Nut Corp., Sandusky, Ohio, landed at Cleveland's lakefront airport. Associate Editor Don Hammerstrom clambered aboard and was whisked 60 miles west to do a story in this issue. It takes 90 minutes to drive to Sandusky from our offices, but portal-to-portal time was only 30 minutes by plane.

The story, incidentally, involves S. J. Cole, our December, 1960, Usership Contest winner.

Don writes many general news articles. He joined STEEL in 1958 after writing and editing experience with Lubrizol Corp., Cleveland. He has a B.S. degree from Bowling Green State University (Ohio).

Accolade

Paul E. Anglin, vice president of Capitol Refrigeration Inc., Dallas, writes: "May I take this opportunity to tell you how much I appreciate receiving your weekly publication, which has been helpful in keeping me informed and ahead in managing my departments."

Handy Knowledge

How often have you used the Morse Code lately?

It was of vital importance to Technical Editor Bob Huber, the U. S. Coast Guard, and people stranded in a disabled power boat on Lake Michigan late in the evening of Aug. 13.

Bob and his family had just arrived at a lakeshore cottage to begin their vacation. Bob had gone out on the beach to look at the lake before turning in. The wind was coming up and a storm was brewing. He thought he heard shouts and whistles, but he couldn't be certain because of the noise from wind and surf. He finally decided he was hearing distress shouts and pleas for the Coast Guard.

Bob found a nearby phone and called for help. He then got a powerful flashlight and signaled in Morse to the disabled boat: O. K. But no one aboard apparently could read Morse for they kept calling.

Soon the Coast Guard arrived, but they were searching too far south. Bob got to work with the flashlight again and signaled: N-O-R-T.

"Then, darned if I could remember H," he says. "It has been a long time since my Navy days when I used the code."

But the Coast Guard got the idea without the H, and came north to find the distressed craft.

Jesus Was Right

The mail keeps coming in about our arithmetical error in the July 17 issue. We reported: "Jesus was 8½ per cent wrong when He picked His 12 apostles." Many pointed out that the percentage should read 8-1/3.

Now Mrs. Bina T. Sarver, who works at Sommer Metalcraft Corp., Crawfordsville, Ind., takes us to task for the revised figure: "Jesus was 100 per cent right. He knew from the beginning that one of His disciples would betray Him. Therefore He chose Judas. Read Matt. 26:24."

We just have, and we are properly chastened.

Incidental Intelligence

Geraldine, cleaning woman and our night editor, submits these gleanings from the editors' wastebaskets:

Item: Fifty tons of "snow" arrived at Linden, N. J., on Aug. 25, although the area had seasonably warm weather. It was really shaved ice, which was spread on a street at the Esso Research Center to demonstrate a mobile snow melting device which New York City officials may use this winter.

Item: Charles W. Minkel, a quality control layout inspector at Ford Motor Co.'s Buffalo stamping plant, won a record $15,313 for four separate suggestions to save steel, boosting his awards so far this year to $24,888.

Item: Shelley B. Hutchinson, now 96, started the idea of trading stamps in 1895 to spur his retail shoe business. Later, he joined with Thomas Sperry to make the stamps-for-premiums plan a nationwide success (S&H green stamps).

Who Said That?

Most of us have probably said: "Let George do it." Who are we quoting?

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

TO FIND THE MAN YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking.

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The Metalworking Weekly

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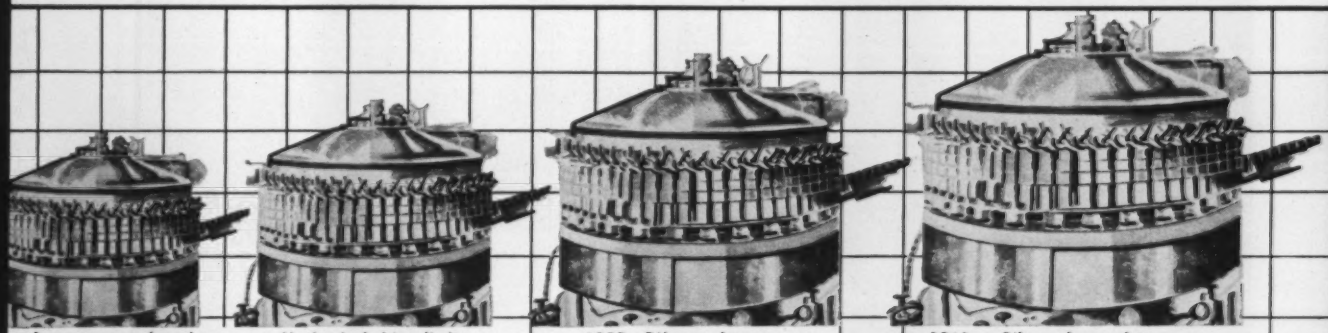
OILGEAR 40 Years of Fluid Power

Report No. 11,101 From Oilgear *Application-Engineering* Files

How OILGEAR HYTAC Drives Improve Filler-Closer Performance — Triple Output —

CUSTOMER: *A Large Food Machinery Manufacturer (Name withheld by request)*

DATA: This manufacturer called upon Oilgear to help solve the problem of producing a filling and closing machine that would exceed the mechanical drive limitations reached when the fill-close rate was increased from 150 to 360 12-oz cans per minute. *Summary of User Requests:* A fill-close rate of at least 425 12-oz cans per minute; accelerate to half speed in 2 seconds—to full speed in 5 seconds without jerky, jack rabbit starts that strain the equipment; reduce spillage and "deadheads"; decelerate to stop in 0.4 seconds; reduce costly losses due to under or overfilling; change speed instantly, easily—with remote control preferred; accurately hold any selected speed regardless of load or electric power variations—viscosity changes; impervious to daily sanitary washdowns; provide trouble-free, low-maintenance, continuous operation.



Average normal mechanical drive—150 12-oz cans per minute.

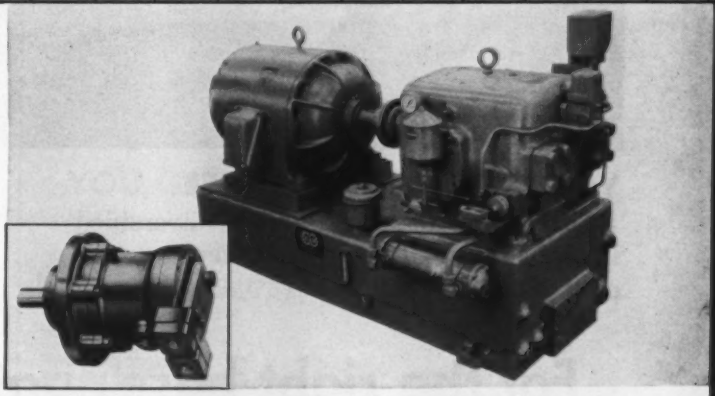
Mechanical drive limit—360 12-oz cans per minute.

1955—Oilgear heavy-duty, Size 20, Any-Speed HYTAC drive—to 600 12-oz cans per minute with improved performance.

1960 — Oilgear heavy-duty, Size 35, Any-Speed HYTAC drive—to 1200 12-oz cans per minute with improved performance.

OILGEAR SOLUTION #1 (1955) Oilgear heavy-duty, Size 20, Any-Speed HYTAC (hydraulic tachometer) drives provided the first step in meeting user requests. These drives on a 6-spindle closer and 60-spout filler smoothly accelerated to full speed in 2 seconds—decelerated to stop in 0.2 seconds; a new, high fill-close rate—to 600 12-oz cans per minute without machine redesign; held *any* preselected speed within ± 0.5% regardless of load, electric power variations or viscosity changes—assuring uniform fill; reduced spillage and conveyor jams. Oilgear heavy-duty HYTAC simplified machine design and reduced maintenance by eliminating slip clutches and electric brakes—and by providing hydraulic cushioning; hydro-dynamic braking; automatic, positive protection against starting and running overloads. Remote, space-saving pump and motor location and completely sealed, leak-tight system provided protection to daily, sanitary washdowns. Users liked this improved performance and speed . . . over 50 similar installations have been made. Some users, however, continued to request higher production rates—with all of HYTAC's advantages.

OILGEAR SOLUTION #2 (1960) Due to the proven ability of Oilgear application-engineered, heavy-duty, drive and control systems to help meet user demands, this manufacturer naturally turned to Oilgear for further engineering teamwork in meeting new, greater production requirements. *RESULT*—new, higher production filling-closing machines that TRIPLE original mechanical drive output—to 1200 12-oz cans per minute with all the same desirable features outlined in the previous installations. One important addition has been made . . . new user satisfaction.



This is the newest Oilgear Power-Pak for filler-closers—Oilgear heavy-duty, Size 35 HYTAC drive components. Unit can be remotely mounted and remotely controlled for new performance, new production speed, new accuracy.

Here is but one reason and proof why designers and builders of machinery turn to Oilgear . . . why users recognize and trust the name . . . why more and more this phrase is heard, "For the lowest cost per year—it's Oilgear!"

For practical solutions to YOUR linear or rotary drive and control problems, call the factory-trained Oilgear application-engineer in your vicinity. Or write, stating your specific requirements, directly to

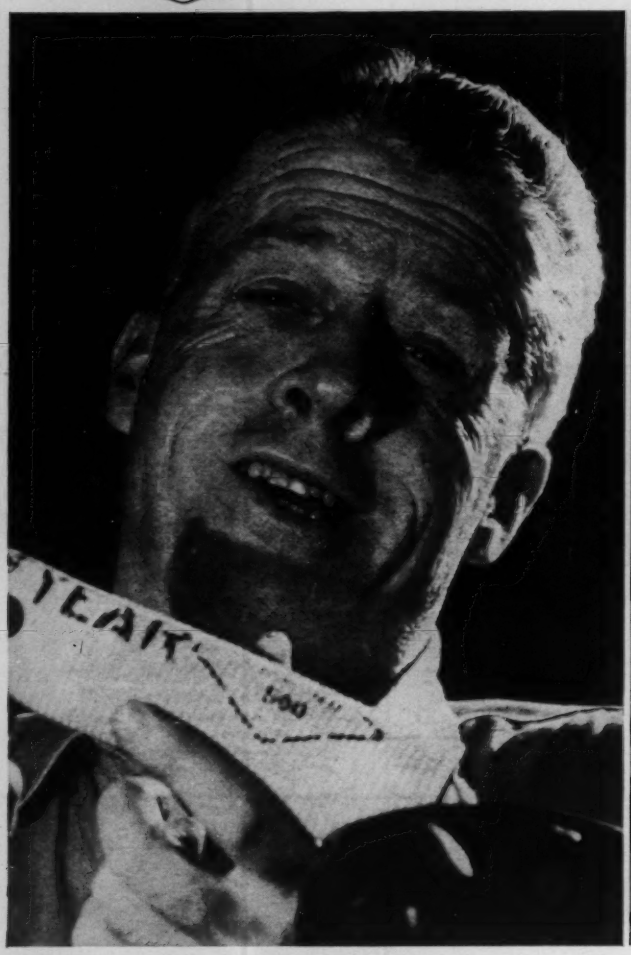
THE OILGEAR COMPANY

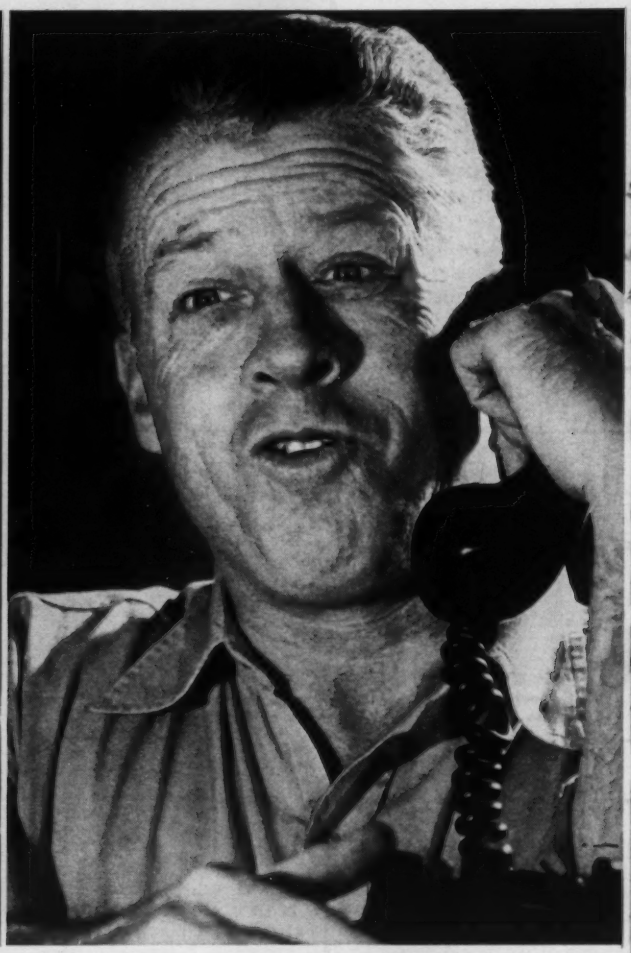
Application-Engineered Fluid Power Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

GOODYEAR

Why not buy hose





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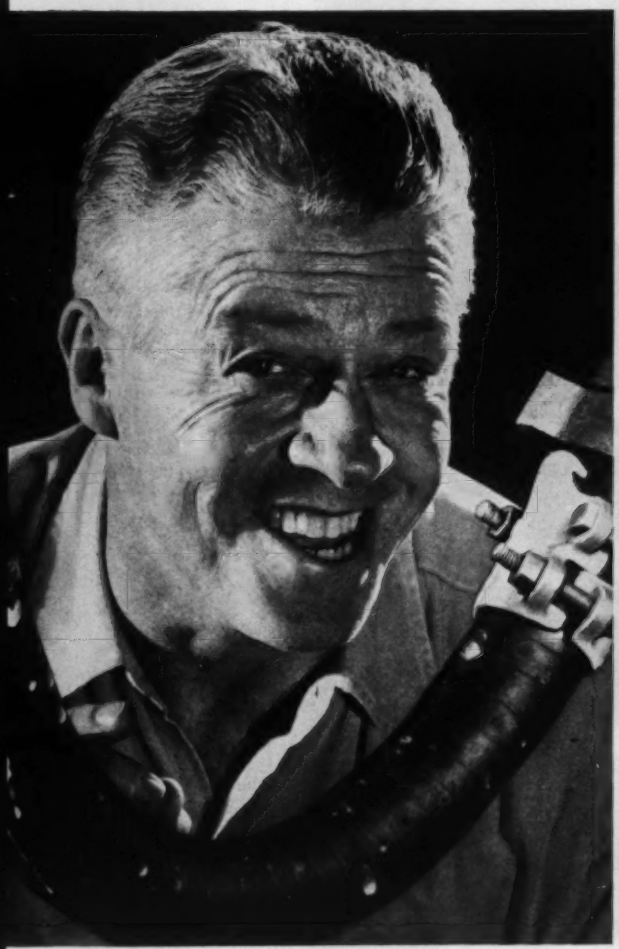
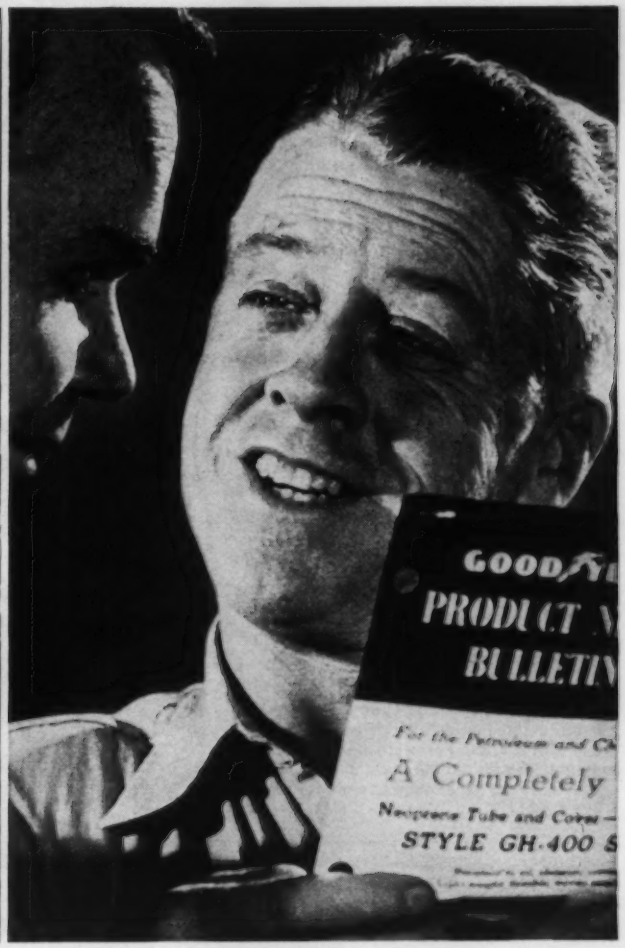
Lots of good things come from GOOD

the easy, Goodyear way?





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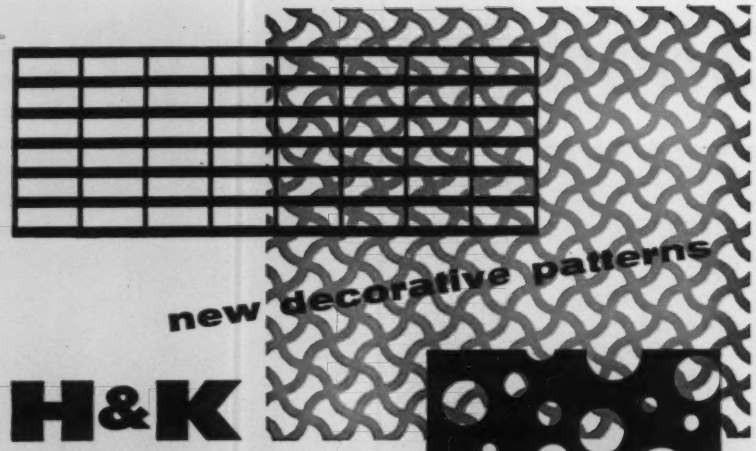
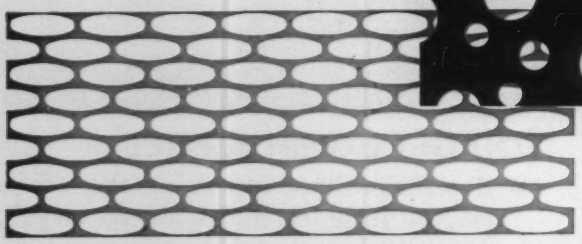
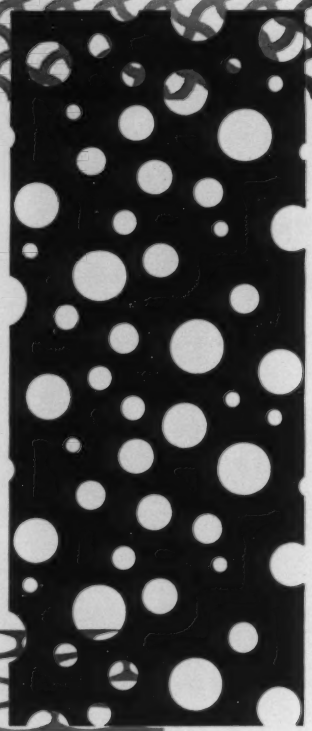


H&K
perforated materials

Passage or control of air, sound, light or fluid . . . decorative concealment . . . component protection . . . eye catching, sales-building beauty—if your product requires any or *all* of these features, you'll find the design and functional versatility you need in the Harrington & King line of perforated materials. Just four of H & K's new patterns are illustrated here. There are many more contemporary and traditional designs, all available in steel sheets for shipment from stock.

And there is also a vast selection of additional patterns and open areas which can be custom fabricated from existing dies. H & K can perforate practically any material. May we put our more than 75 years of experience to work for you?





FIND NEAREST H & K AGENT IN THE 'Yellow Pages'

Listed Under "Perforated Metals"

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Chicago 44, Illinois

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☐ STOCK LIST of Perforated Sheets

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TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

CALENDAR
OF MEETINGS

Sept. 20-22, National Industrial Conference Board: Annual marketing conference, Waldorf-Astoria Hotel, New York. Address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 24-26, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Pressed Metal Institute: Annual meeting, Grand Hotel, Point Clear, Ala. Institute's address: 3673 Lee Rd., Cleveland, Ohio. Managing director: J. D. Keith.

Sept. 25-27, American Hot Dip Galvanizers Association: Fall meeting, Sheraton-Jefferson Hotel, St. Louis. Association's address: 5525 Manning Place N. W., Washington 16, D. C. Secretary: Charles E. Perry.

Sept. 25-28, American Welding Society: National fall meeting, Adolphus Hotel, Dallas. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Sept. 25-28, Association of Iron & Steel Engineers: Annual convention, Penn-Sheraton Hotel, Pittsburgh. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 25-28, Industrial Building Exposition and Congress: Coliseum, New York. Contact Clapp & Poliak Inc., 34 Madison Ave., New York 17, N. Y.

Sept. 27-28, American Die Casting Institute Inc.: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Oct. 1-5, Electrochemical Society Inc.: Fall meeting, Statler Hilton Hotel, Detroit. Society's address: 1860 Broadway, New York 23, N. Y. Executive secretary: Robert K. Shannon.

Oct. 3, Hoist Manufacturers Association: Meeting, Statler Hilton Hotel, Cleveland. Association's address: 1 Thomas Circle, Washington 5, D. C. Executive secretary: Joe H. Peritz.

Oct. 4-6, American Machine Tool Distributors' Assn.: Fall meeting, Penn-Sheraton Hotel, Pittsburgh. Association's address: 1500 Massachusetts Ave. N.W., Washington 5, D. C. General manager: James C. Kelley.

LOCTITE GIVES YOU

THE IMPOSSIBLE PERFECT FIT

Only a small percentage of the adjacent metal surfaces of a press or interference fit are actually in contact. Yet the security of the entire assembly depends on that small area of contact.

Rigid tolerances are specified, and extra machining operations are performed to increase the area of contact. Nevertheless, it has been impossible to mate two metal surfaces perfectly, one inside the other. The Perfect Fit, like Infinity and Perpetual Motion, has seemed to exist only in theory.

YET A FEW DROPS OF LOCTITE CAN NOW PROVIDE WHAT THE MOST EXPENSIVE OF MACHINING METHODS CANNOT.

LOCTITE Sealant is a penetrating liquid resin that by capillary action is drawn into all the voids in a press or interference fit, filling them completely. Once there, LOCTITE hardens automatically into a tough, solid, load-bearing plastic film, capable of supporting loads in excess of 25,000 pounds per square inch, thus providing *A PERFECT FIT* of adjacent surfaces.

FACTS ABOUT LOCTITE SEALANT:

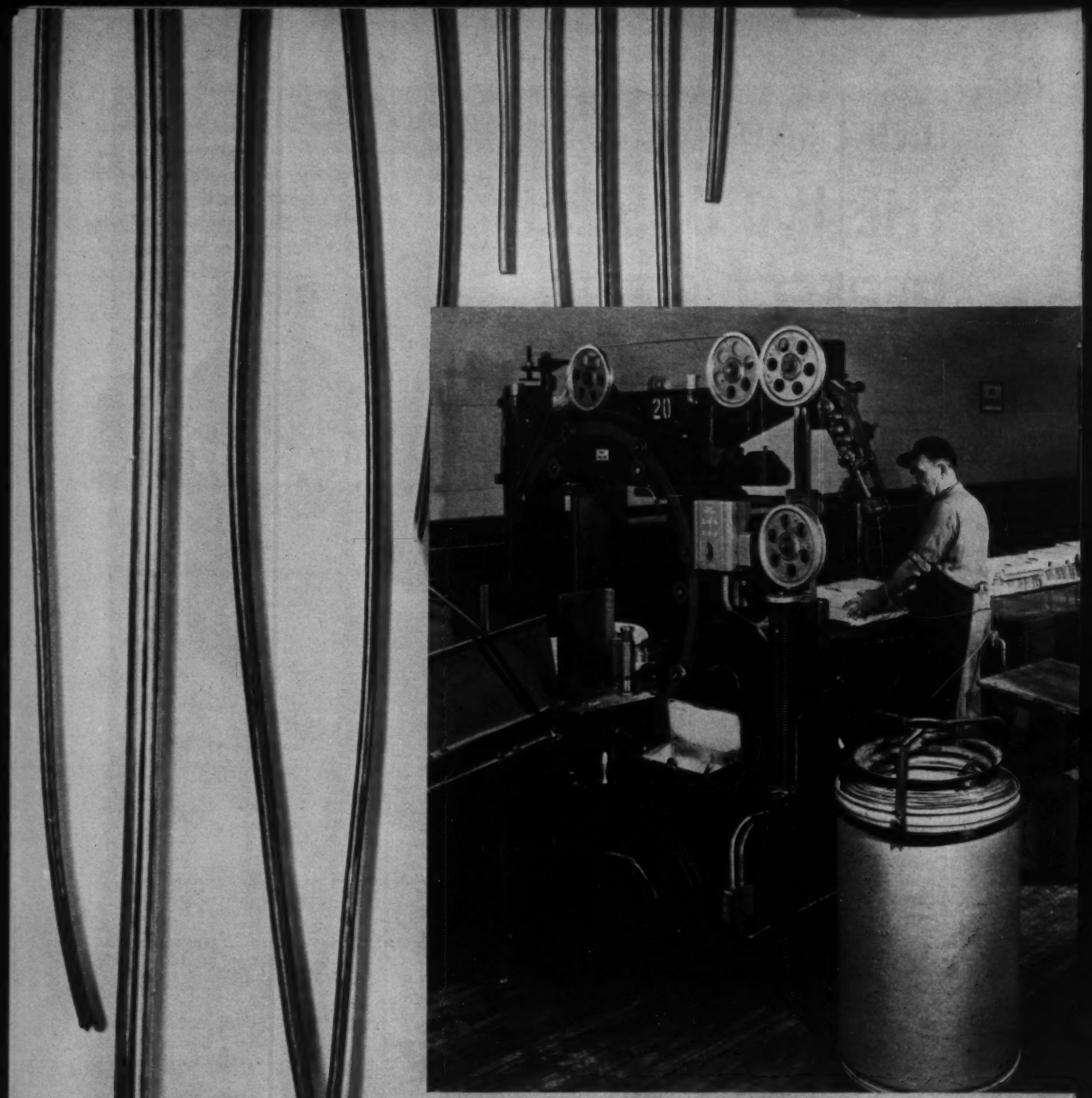
- LOCTITE is easy to use. It requires no mixing or heating.
- LOCTITE is 100% active. It totally fills the voids in press fits and threaded assemblies.
- LOCTITE contains no solvents—requires no solvents. There is no hardening shrinkage due to solvent evaporation.
- LOCTITE requires no expensive equipment. The bottle is the applicator; or mass application procedures can easily be set up with "around-the-shop" parts and materials.
- LOCTITE will withstand temperatures up to 300°F.

LOCTITE Sealant makes a slip fit as strong as a press fit, a press fit stronger. It can be used to relax tolerances and to improve reliability.

Wherever metals are LOCKED—RETAINED—SEALED there is an opportunity to cut costs and increase profits with LOCTITE. Details on your application bring immediate response from our Application Engineering Department. Write today.

LOCTITE® SEALANT

AMERICAN SEALANTS COMPANY
257 North Mountain Road • Hartford 11, Connecticut



"Next to paper and ink, tying wire is our most important purchase," says Chicago *TRIBUNE* management . . . clear proof that the *TRIBUNE*'s use of Republic Wire for automatic bundling of newspapers is based on preference and specification. Wire used is soft galvanized, tough, yet easy forming—perfectly suited to fast handling in this publisher's automatic wire tying machines.

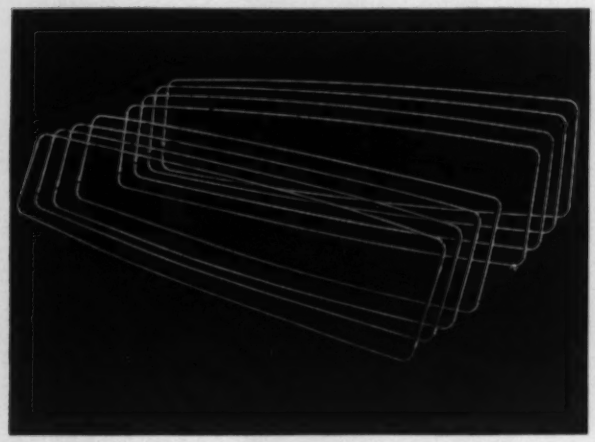
Steel

Strong
Modern
Dependable

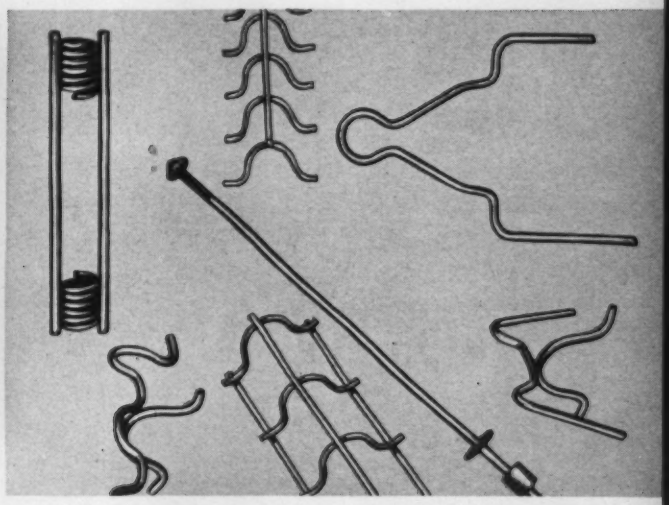
WIRE? WRITE, OR PHONE REPUBLIC

Republic has a reputation for solving wire worries. Rely on it. Talk to a Republic Wire Metallurgist—a man who knows and *understands* industry's varying needs for tensile, elongation, flow and formability. His experience, much of it gained by working on the scene with manufacturers like yourself, is backed by skill at the manufacturing level, plus undivided quality responsibility. Adherence to your specifications is under full Republic control, from ore selection to your plant . . . assuring that the wire you get will consistently meet your specific requirements.

Republic Wire Metallurgists can be called in at any time, on any problem of wire selection, application, or processing . . . *without obligation.* Wire? Write or call Republic, now.



B-W MANUFACTURERS, INC., former choice of wire for these popular trouser creasers lost its galvanized coating when flattened and bent to form the four right angles. Republic Wire Metallurgists recommended Republic *Electro-Galvanized* Wire. Result—profitable, perfect production ever since. Electro-Galvanizing electrically deposits pure zinc particles on the wire in deep uniform layers—permanently bonded and *tough*—yet pliable enough to permit tying the wire in knots without cracking the zinc coating!



MEADOW STEEL PRODUCTS, INC., keeps prices competitive on masonry construction accessories with adaptable Republic Manufacturers' Wire. More than 20 different parts are made from only a few types of wire, lowering inventory and material costs, and greatly simplifying production.

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Please send information on the following kinds of Republic Wire:

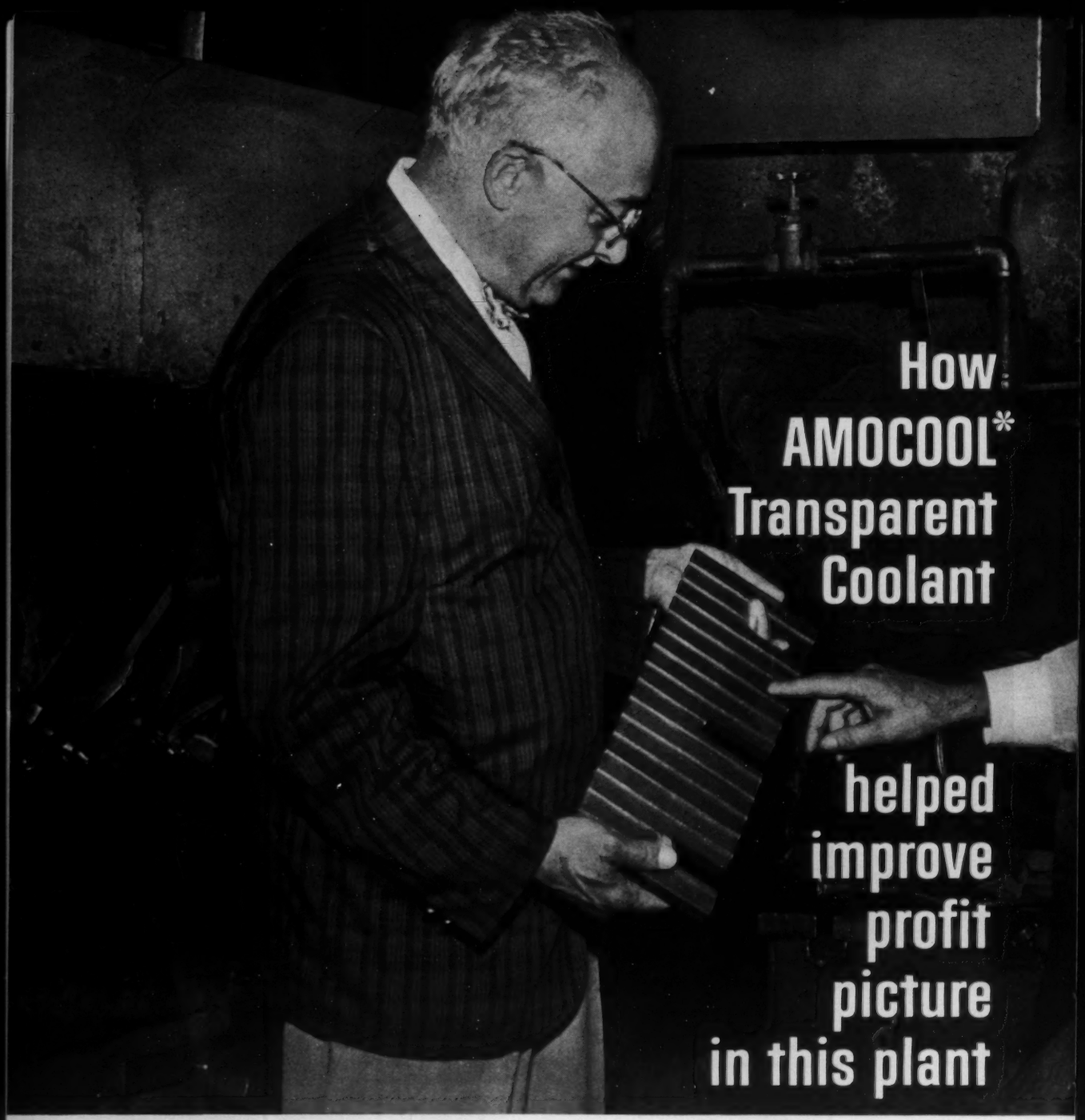
- ☐ Manufacturers' Coarse Wire
- ☐ Spring Wire
- ☐ Screw Wire
- ☐ Rivet Wire
- ☐ Heading Wire
- ☐ Have a Republic Wire Metallurgist call

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____



How AMOCOOL* Transparent Coolant helped improve profit picture in this plant

*Trademark

BY PAUL E. "PAPPY" STRATTON

About the Author. "Pappy" Stratton has been providing technical help on lubrication and metalworking problems to customers in the Detroit area for nearly all of the twenty-five years he has been working for the company. In addition to having this store of practical experience to help him, Pappy has completed the Company's Sales Engineering School.

* * *

By using a soap-base grinding compound, Detroit Edge Tool Company was getting excessive corrosion and rust on work and grinding machines. Oil vapor was collecting on machines and on the ceiling, causing dirty working conditions. Most important, high wheel loading was causing frequent down-time for wheel dressings.

We worked out a test program on AMOCOOL Transparent Coolant with the management. On our first test on one surface grinder, feed pressure was cut substantially while at the same time metal removal was increased.

Eliminate reworking because of rust, reduce wheel loading and extend intervals between wheel dressings; do these and you increase profit per unit, explains Detroit Edge Tool president, Dan Ebbing, to P. E. "Pappy" Stratton of American Oil. Plant manager, John Yonker (right) and Sam Vineh, operator, look on.

The cost of reworking parts to remove rust was eliminated. Time required to clean machines to get rid of the odor was cut in half. Less wheel loading and fewer wheel dressings have upped production and reduced costs. Our test program paid out in an improved profit picture. All grinding and drilling equipment has been converted to AMOCOOL Transparent Coolant.

* * *

Would you like this kind of technical help to assist you in improving profits? Get it by calling the American Oil Company office nearest you.

Quick facts about
AMOCOOL Transparent Coolant

- Clear, transparent fluid
- Controls corrosion on work and machines
- All chemical. Does not support bacteria growth
- Unaffected by humidity
- Fire resistant
- Odorless

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Nearly forty years ago, Elkay Manufacturing Company built its first stainless steel sink. Then—as now—they relied on Ryerson for the finest quality material and service.

Through the years, Ryerson has also contributed important value analysis aid—helping Elkay maintain national prominence in the manufacture of stainless steel sinks for home and commercial use.

These same plus values on stainless steel can help you solve problems of selection and application . . . assure you the utmost in day-in, day-out dependable service. Get all the details from your Ryerson Representative.

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METALOGICS

PLUS VALUES IN STEEL • ALUMINUM • PLASTICS • MACHINERY

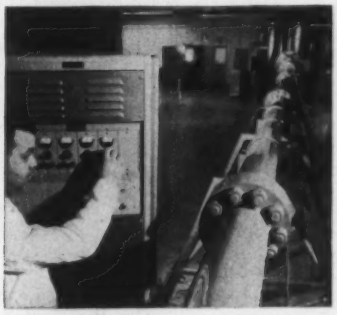
Steel Executives Answer the President on Prices

Roger M. Blough, chairman, U. S. Steel Corp., and other steel industry executives, including Arthur B. Homer, chairman, Bethlehem Steel Co.; Logan T. Johnston, president, Armco Steel Corp.; and A. S. Glossbrenner, president, Youngstown Sheet & Tube Co., have responded to President Kennedy's "hold your price line" letter.

In essence, they agreed with the President's concern over inflation. But they challenged the administration's logic in blaming steel prices for inflation. Said Mr. Blough: "The pressures of the market place are inexorable and cannot be disregarded." No mentions were made of what the industry plans to do about prices.

Implicit: The industry will make its own decisions.

Mach 20 Shock Tube Tests Spacecraft Models



This ultra-high-pressure (100,000 psi) shock tunnel is used to test models of aircraft and spacecraft under re-entry conditions. The models are placed in the vacuum tank portion of the combustion driven system. Republic Aviation Corp.'s Re-entry Simulation Laboratory uses the tunnel to check aerodynamic performance, rate of heating, and other re-entry problems at speeds of 15,000 mph.

Capital Spending Holds Upward Trend

Capital expenditures are expected to hit a $35.9 billion rate in the fourth quarter—third highest since the record third quarter of 1957. Manufacturing firms will spend about 5 per cent less in 1961 than they did last year. The story on Page 53 shows the spending trends in major industries.

Business Abroad

British machine tool builders have increased deliveries 40 per cent at home and 18 per cent abroad since the start of the year. But orders equal to ten months' work have piled up during that time . . . Poland is set to pump about two-thirds of a billion dollars into heavy industry expansion. Most of

the money will go to metal facilities and ore field development . . . A Russian purchasing mission will go to Japan this month to negotiate a $250 million oil pipeline deal.

U. S. Autos: Market for Foreign Metalworkers

White Motor Co., Cleveland, has introduced a line of compact trucks with diesel engines made by Perkins Engine Co. Ltd. in Peterborough, England . . . Dominion Forge Ltd., Windsor, Ont., will supply more than 50 per cent of the connecting rods for the 1962 Lark . . . Eastside Plating Co., Windsor, is bidding for a $75,000 contract to plate Lark grilles.

Armco to Add 2nd Aluminized Steel Line

Aluminized steel is moving out of the specialty category and may be considered a major product, says Logan T. Johnston, president, Armco Steel Corp., Middletown, Ohio. Armco, now producing about 75,000 tons of aluminized steel at Butler, Pa., will build a new line at Middletown. Capacity of the new line: 100,000 tons annually.

Farm Equipment Makers Forecast Better Year in 1962

Farm machinery sales, set back this year by weather conditions and government regulations on planting, should improve in 1962. That was the consensus of manufacturers attending the 68th annual convention of the Farm Equipment Institute in Chicago last week. Optimism for next year is buoyed by expected improvement in the general economy, the likelihood of higher farm income, low dealer inventories, and the introduction of new products.

Aluminum Pipemaker Sees Big Market

An aluminum underground pipeline system for connecting gas mains to home lines has been developed by Reynolds Metals Co. The pipe comes in coils of 300 ft or longer, eliminating the need for intermediate joints. A vinyl-butyl rubber laminate protects the exterior. Reynolds says the market potential is about 3 million lb a year.

Seaway Income Declined in 1960

The St. Lawrence Seaway Development Corp.'s 1960 income was $3,115,040, down from $3,204,494 in its first year of operation. Reasons for the decline: Labor controversies and strikes, world economic conditions, and a depressed shipping market. Cargo moving through the Seaway last year weighed 20.3 million tons.

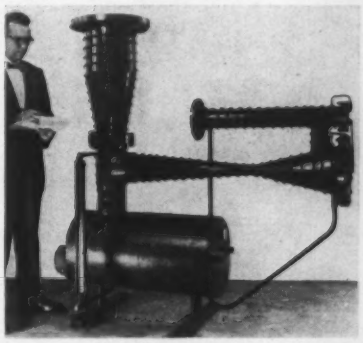
Big Machine Has Sensitive Touch

Rocketdyne Div., North American Aviation Inc., has built a 2.5 ton machine that can measure thrust as gentle as one-thousandth of a pound. It will be used to gage the thrust of ion rocket engines and other electrical propulsion

systems. The propulsion engine is supported by a pendulum suspension. Its thrust is measured by the amount of current required by a magnetic force motor to hold the pendulum stationary.

Vacuum Processes Set for Boom

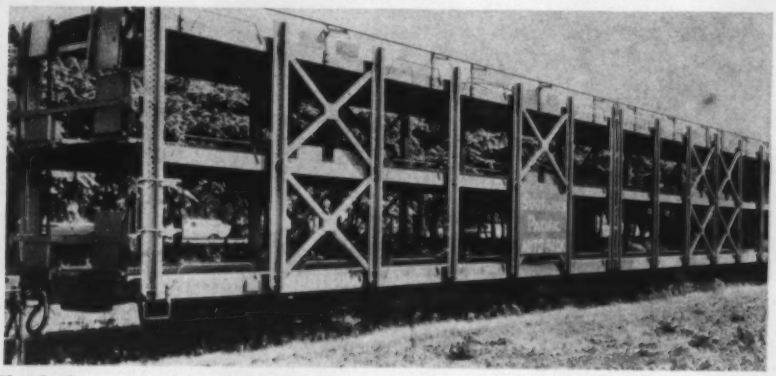
Metalworking management will pay increasing attention to vacuum technology, say the experts. Reasons: It's a nearly universal, high quality "atmosphere" for heat treating, and it refines basic metals and alloys to exceptionally clean levels. One expert predicts tens of thousands of units will be in operation in five years. For the latest in techniques and equipment (like the pump shown at right), see Page 100.



September Truck Production Heads for Nine Year High

Ward's Automotive Reports estimates that U. S. manufacturers will produce 103,200 trucks this month. September production has not passed the 100,000 mark since 1952 when the Korean War spurred the industry. *Ward's* attributes the scheduling to fast recovery from model changeovers and regards it as evidence of industry optimism for "an unusually good fall and winter market."

Convertible Flatcar Rides Smoothly



Shock from coupling impacts is reduced by the special underframe of this extra long flatcar built by Thrall Mfg. Co., Chicago Heights, Ill. The trilevel auto rack may be removed in a matter of hours, says the developer, Evans Products Co., Plymouth, Mich.

Study Shows Chief Causes of New Firms' Failure

A lack of management knowhow, personality defects, and undercapitalization were the chief causes of failure in "new" small firms studied by the Small Business Administration. Covering 81 companies in the Providence,

STEEL The Metalworking Weekly

September 18, 1961 Vol. 149 No. 12

CONTENTS

THE EDITOR'S VIEWS:
The Big Labor Issues 49

WINDOWS OF WASHINGTON:
Counterattack on Steel Price Freeze 60

MIRRORS OF MOTORDOM:
Chrysler Regenerates Quality Image 69

THE BUSINESS TREND:
Outlook Good Despite Weaknesses 73

NEWS SECTION:
Capital Spending Trends Upward ..53
Auto Labor: Keeping Locals in Line 54
Imports Hurt More Small Firms 55
Analyst Predicts Slight Housing Dip 56
Packaged Home Sales Climb 57
Machine Spews 2000 Cans a Minute 59
Who's Going Where in Europe 63
Flexibility: Key to Prosperity 64
Principles of Foreign Expansion 66
Republic Expands Bright Annealing 83

TECHNICAL SECTION:
Technical Outlook 99
Vacuum Processes Set for Boom ..100
Picking Adjustable Speed Drives ..104
Progress in Steelmaking—Rebuild Boosts Coil Size, Monthly Output 108
New Alloy "Machines Like Butter" 110
Machine Topics—Computers Aid Programing of Numerical Control 114
Growth Market for Steel Castings 118

MARKET SECTION:
Market Outlook 137
Complete Index to News and Prices 137
Cesium Picked for Stardom in Space 139
Navy Places Missile, Plane Orders 144
District Ingot Rates and Chart 146
Scrap Price Rise Is Again Stalled ..159
Nonferrous Metals—Congress Holds Key to Tin Prices 162
Steel Jobs at 11-Month High 165
Scrap Use Down in July 165

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 77
New Products 121
New Literature 135
Advertising Index 167

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R. I., area, the two year study showed 40 of the firms failed; twelve were marginal survivors; twenty-one were limited successes; and eight were considered successful or potentially profitable.

Crumpling Cans May Cushion Moon Landing

Working under an Air Force contract, scientists of General Electric Co.'s Missile & Space Vehicle Dept. will spend the next year studying the buckling of metal cylinders and cones. Possible application: Crumpling cylinders could be extended from a spacecraft to soften its landing on the moon. Crumpling occurs in a definite pattern, as shown in the photo, and large amounts of energy are absorbed in the process.

High Speed Transmission System Uses Telephone Line

A high speed transmission system capable of sending 150 Teletypewriter messages simultaneously over an ordinary telephone line has been developed by General Dynamics Corp.'s Electronics Div. The Dynamic Error-Free Transmission (DEFT) system does not require coaxial cables or broad band, VHF radio channels needed for other high speed, multiple message systems.

Straws in the Wind

The Metal Treating Institute reports that January-July billings were $22.7 million, 9.5 per cent below the year ago level . . . Reynolds Metals Co. claims the railroad industry will double its use of aluminum for freight cars by 1965. It used 20 million lb last year . . . The Navy's first, nuclear powered surface ship, the *Long Beach*, was commissioned Sept. 9. Her ship service turbine generators produce enough electricity to supply the residential needs for a community of 30,000 . . . Production of steel ingots in August totaled 8,657,000 net tons, up from the 8,091,958 reported for July, reports the American Iron & Steel Institute.

Metalworking Pulse

The Business Trend: The Labor Day holiday and the General Motors strikes caused a 7 point decline in STEEL's industrial production index for the week ended Sept. 9. **Autos:** Output will be on the low side until full production is resumed at GM. Some of the other makers are scheduling Saturday work to build stocks of 1962 models. **Steel:** Scattered auto plant closings have been largely counteracted by demand gains from several other large consuming industries.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49 = 100)
  Week ended Sept. 9 .... 164†
  Year ago 137
  Details on Page 73
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Sept. 16 .. 55,000*
  Year ago 85,879
  Details on Page 70
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Sept. 16 2,050,000*
  Week ago 2,032,000
  Details on Page 146

†Preliminary. *Estimated.

Quality... the best economy of all

Another product of Sunoco research . . . a fire-resistant hydraulic fluid

The flame test, above, dramatizes the effectiveness of Sun's new fire-resistant hydraulic fluid. The wick in the conventional fluid burns readily; the wick in Sun's new fluid just can't be lighted.

SUNSAFE, a water-in-oil emulsion, eliminates fire hazards . . . provides increased safety to personnel and equipment. At the same time, operators get the essential performance characteristics of a top-grade hydraulic oil—low rates of wear, long service life, and protection against rust and corrosion.

This combination of *quality* in engineering know-how, and *quality* in product, proves once again that *quality* in any sense is the best economy of all.

For 73 years Sunoco has meant quality right down the line. Today, this quality is found in more than 400 Sunoco industrial products. SUN OIL COMPANY, Phila. 3, Pa., Dept. I-14.
In Canada: Sun Oil Company Limited, Toronto and Montreal.

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

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SUNOCO®

AO Aluminized Clothing Reduces Fatigue, Increases Efficiency, Is Safer

Wherever high heat is a work hazard, lightweight AO Aluminized asbestos or rayon protective clothing is the best answer. It will help reduce workers' fatigue and boost their efficiency. The aluminum coating reflects 90% of all radiant heat, will not peel, has excellent abrasion resistance.

AO Aluminized asbestos is a herringbone weave, weighs only half as much as ordinary asbestos. It's more durable, more flexible, and more comfortable when worn for long periods. Small splashes of molten metal will not cling to it. They bounce right off the surface. To protect against heat alone, AO Aluminized rayon clothing gives you high radiant heat reflection but is much lighter in weight.

You can choose from a full line of AO clothing that has been designed to give maximum protection. Aluminized asbestos is recommended for high heat, sparks and metal splash. Aluminized rayon is best suited to jobs where heat does not require the insulating properties of asbestos. Contact your AO Safety Products Representative for complete details and prices.

Your Surest Protection . . . AO SURE-GUARD Clothing

American Optical COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

Throughout the steel industry, the Blaw-Knox name means exceptional service and the highest standards of performance. Behind this name are the engineering force and plant capacity necessary to meet steelmakers' most advanced requirements for modern automatic equipment. Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Pa.

BLAW-KNOX

a

b

c

Rolling Mills and Processing Equipment for Shape Rolled Products

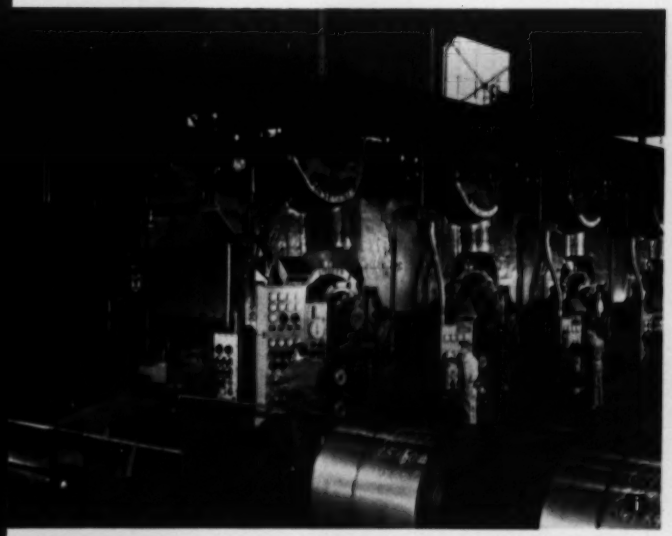
a Combination 46- x 114-inch Blooming-Slabbing Mill and 38- x 53- x 114-inch 4 high Plate Mill. b Wide Flange Beam and Structural Mill. c Merchant Mill.

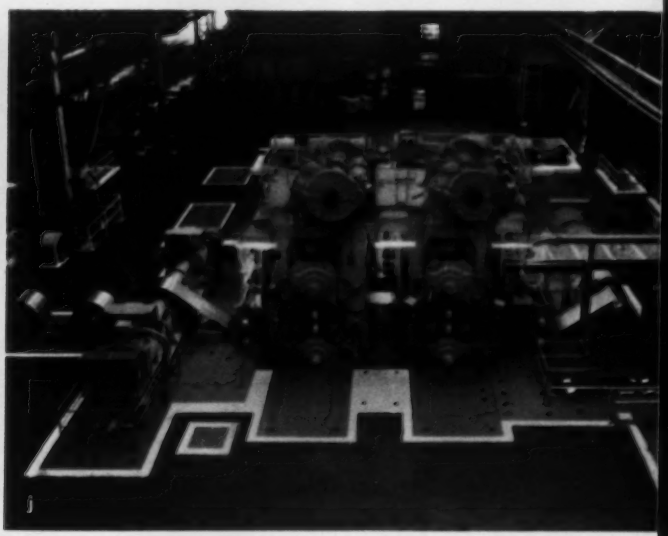
Rolling Mills and Processing Equipment for Shape Rolled Products (Continued)

d Continuous Butt Weld Pipe Mill. **e** High Speed 2-roll Straightener in Cold Drawn Bar Line. **f** Roller Straightener for Hot Rolled Angles.

BLAW-KNOX

BLAW-KNOX





Rolling Mills and Processing Lines for Flat Rolled Products

g 46- x 90-inch Universal Slabbing Mill. **h** 56-inch Hot Strip Mill. **i** 60-inch Tandem Cold Strip Mill. **j** 19- and 53-inch x 48-inch Twin Temper Mill. **k** Continuous Annealing Line. **l** Electrolytic Tinning Line. **m** Continuous Galvanizing Line.

n **Iron, Alloy Iron, Steel and Alloy Steel Rolls.**

o **Foundry Products:** Peels, Slag Pots, Charging Boxes, Ingot and Charging Cars, Ladles, Trunnions and Rings, Blast Furnace Hoppers and Bells.

p **High Alloy Castings:** Radiant Tube Assemblies, Furnace Parts, Continuous Annealing, Conveyor, Feeder, Deflector and Zinc Rolls, and Heat Exchanger Elements.

q **Steel Plant Equipment:** Ladle Additions Feeders, Autopours,® Dolomite Machines, Water-cooled Doors, Frames, and Reversing Valves.

BLAW-KNOX

ENGINEERED PACKINGS
for Steel Mills

Through positive sealing, Garlock CHEVRON* Packings make a big difference in efficiency of hydraulic-pneumatic equipment in steel mills.

Wherever fluid power is used in steel producing, apply Garlock CHEVRON Packings to increase equipment efficiency.

On rams, plungers and reciprocating-rod applications of all types, CHEVRON Packings seal tight against loss of hydraulic fluids and pressure. Friction and wear, too, are minimized with CHEVRON Packings on the job.

Last much longer, need less maintenance than ordinary V-type packings. Garlock CHEVRON Packings have an exclusive hinge-like construction. As pressures increase, the packing rings tighten to prevent leakage. When pressures decline, the rings ease off to permit free operation of the rod, ram, or piston without leakage. CHEVRON packing rings provide adequate heel clearance for easy installation. Once installed, further gland adjustment is rarely, if ever, necessary to compensate for pressure changes. Garlock CHEVRON Packings work very efficiently in shallow stuffing boxes. Apply them against water, steam, oil, gases and chemicals in temperatures to 600°F.

For hydraulic-pneumatic service of all types, Garlock offers a complete line of products . . . **Garlock "O" Rings** for static and dynamic applications . . . **Garlock Chevron Rings** for rod and stuffing box seals on reciprocating applications . . . **Garlock Cup Packings** for hydraulic-pneumatic, low-friction service.

Find out more about the various materials and sizes of Garlock Hydraulic-Pneumatic Packings. Call your Garlock representative at the nearest of the 26 Garlock sales offices and warehouses throughout the U.S. and Canada. Or, write for Catalog AD-115 (CHEVRON Packings), AD-148 ("O" Rings), and AD-145 (Cups). Garlock Inc., Palmyra, N.Y.

GARLOCK

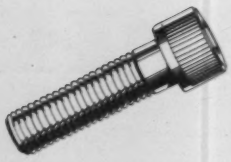
Canadian Div.: Garlock of Canada Ltd.

Plastics Div.: United States Gasket Company

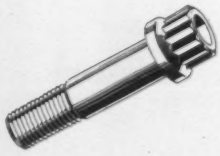
Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.

*Registered Trademark

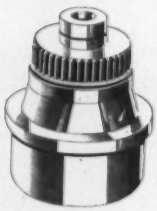
SPS human engineering



INDUSTRIAL FASTENERS like this UNBRAKO Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.



AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other lightweight, high-strength exotic metals.



NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

improves the fit where you sit

Columbia office chairs are something special in comfort and efficiency. And little wonder.

An astonishing amount of new thinking, research, testing and just plain sitting went into their creation two years ago.

The assigned engineers had never before designed a chair! There were no "sacred cows".

A roomful of competitive chairs pointed up fault after fault. Too narrow. Too hard. Skinny arms. Teetery. Pushy. Hard to adjust.

Human engineering took over. Engineers, salesmen, executives, secretaries and even visitors were recruited. Fat one. Thin one. Tall. Short. Erect. Slouched. Some sat in warm modeling clay. Others sat in scientific contour measuring devices. Dozens just sat and sat . . . and filled out questionnaires.

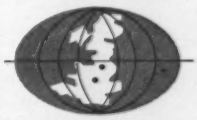
Out of all this, and some solid technical research in the laboratory, came chairs with exciting styling and heavenly comfort. No pinch. No teeter. No aches. And when you lean back, you get what you leaned back for—blessed relaxation.

Today there are 27 styles in the skyrocketing Columbia Chair line—available in 98,000 combinations of color, fabric, style, size and type of seat—to complement any Columbia Office Furniture grouping.

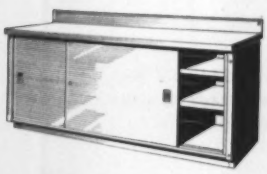
Unusual? Not at all. Chairs, filing cabinets, fasteners or nuclear components, SPS brings reliability and enthusiasm to bear on any problem. Can we handle one for you?

SPS

where reliability replaces probability



STANDARD PRESSED STEEL CO., Jenkintown, Pa., Santa Ana, Calif. • The Cleveland Cap Screw Company, Cleveland, O. • Columbia Steel Equipment Div., Fort Washington, Pa. • International Electronic Industries, Inc., Nashville, Tenn. • National Machine Products Div., Utica, Mich. • Standco Canada, Ltd., Toronto, Canada • Unbrako Socket Screw Co., Ltd., Coventry and Unbrako Steel Co., Limited, Sheffield, England • Unbrako Schrauben G.m.b.H., Dusseldorf and Koblenz, W. Germany.



SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.

Protect downcomers from abrasion with heat-resistant concrete

A heat-resistant concrete lining, being gunited in place, solves the problem of abrasion in this blast-furnace downcomer system. Made with Lumnite calcium-aluminate cement and aggregates, this smooth, jointless concrete lining will withstand the abrasive attack of particles in the gas stream — extending the life of the steel structure.

In new installations or repairs, monolithic linings are easily and economically placed — by guniting, casting or troweling. Unit downtime is reduced because concrete reaches service strength in 24 hours.

Other applications in blast-furnace systems include foundation pads, blast main linings, stove domes and other areas where resistance to heat and corrosion are required.

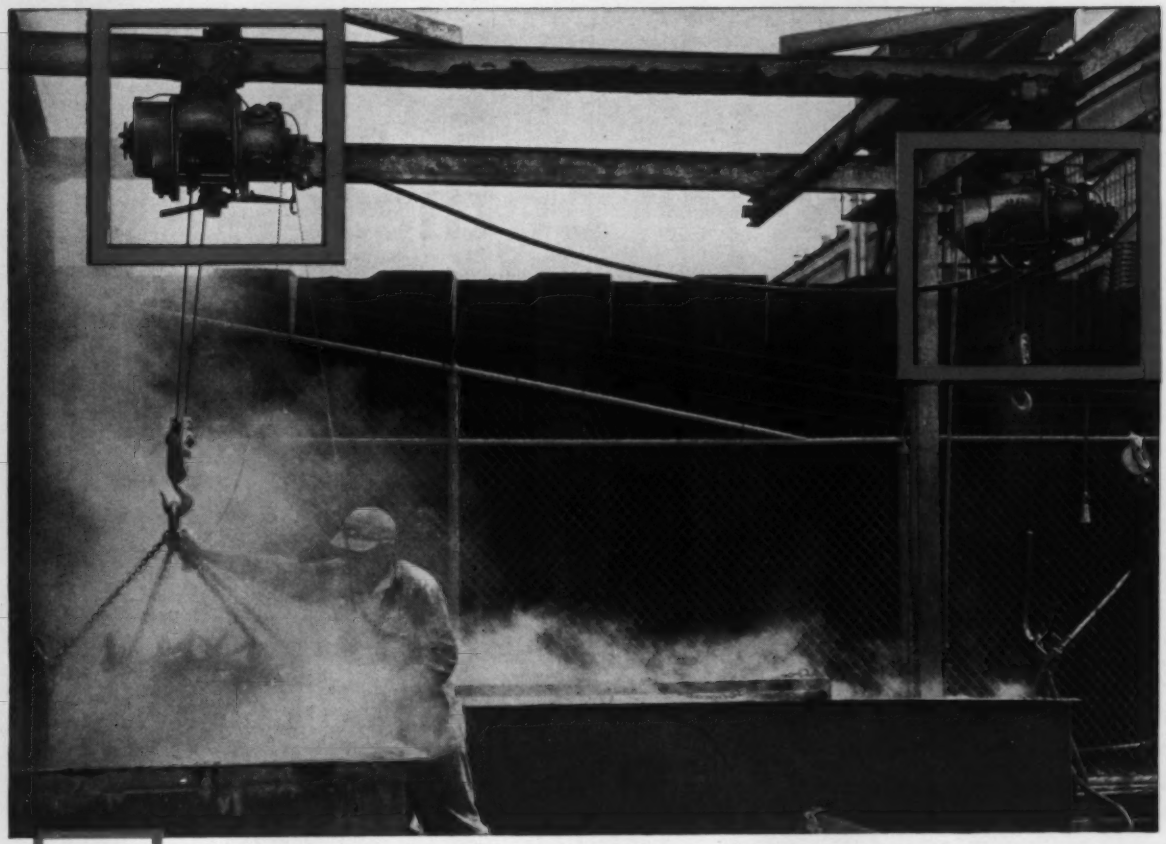
For convenience, castables bonded with Lumnite cement are available from leading manufacturers of refractories. These are packaged mixtures, ready for use by adding only water. For more information, write Universal Atlas, 100 Park Avenue, New York 17, New York.

"USS," "Atlas" and "Lumnite" are registered trademarks

L-186

Universal Atlas Cement
Division of
United States Steel

OFFICES: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco



AIR HOIST *is safe from corrosion ... can't cause explosion!*

The air motors that power Ingersoll-Rand AIR hoists are unaffected by fumes, vapors or moisture. Dust and dirt cannot get in to cause premature wear or corrosion and interfere with the hoist's operation. And . . . because the motor is operated by air, not electricity, there can be no sparks which could set off a damaging, even lethal, explosion.

Maintenance of Ingersoll-Rand hoists is unbelievably low—electrical contacts, switches and windings cannot cause trouble because these hoists are powered by air!

PROTECTS LIVES, LOADS, PROPERTY...

Loads can't "run away" even if air supply should fail.

PRECISE FINGER-TIP CONTROL, INFINITELY VARIABLE SPEEDS...

Simple, foolproof, air throttle permits "stepless" speed control of loads.

● Over 110 different sizes of Ingersoll-Rand AIR hoists (capacities from 200 to 24,000 lbs.) are available to solve your lifting problems. For details, or a demonstration, call your nearby Ingersoll-Rand representative.

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

Planned Annual Retooling increases output per man

217A-8

Which of these parts should be investment cast?

... *All* the parts except the milling machine collet at the top right – which is a "natural" for conventional lathe work. Even the helical impeller the men are examining is best made as an investment casting – the helix is undercut in such a way that no cutting tool could reach inside to remove the metal.

"Naturals" for investment casting are usually parts that are too intricate to be made economically by any other process, or involve alloys or quantities that make them impractical to produce by other methods. In other words, when it looks as if you might have to sacrifice a design because its complexity makes the cost prohibitive, or forego a preferred alloy because it is difficult to machine, then it's time to take a long, hard look at investment casting.

But . . . it's not always as easy as it sounds to spot the parts that are "made" for investment casting. That's where the Arwood sales engineer comes in. He knows Arwood expects him to show a customer how to get the most from the process. To help keep your cost down he may have to suggest a filleted radius here . . . or a tolerance opened up there. Then too, on occasion he may readily have to admit the part should not be investment cast at all. However, he also knows that if you just can't have the part made any other way, Arwood will go all the way down the line to have it investment cast for you.

Our five plants cast every castable metal and alloy, including magnesium and superalloys. Each has its own research, tooling, quality control and production facilities. In short, if it can be investment cast, we can investment cast it.

Machine the simple . . . cast the complex

A complete service from design through tooling, production and finish machining. Seventy-one engineering representatives from coast to coast.

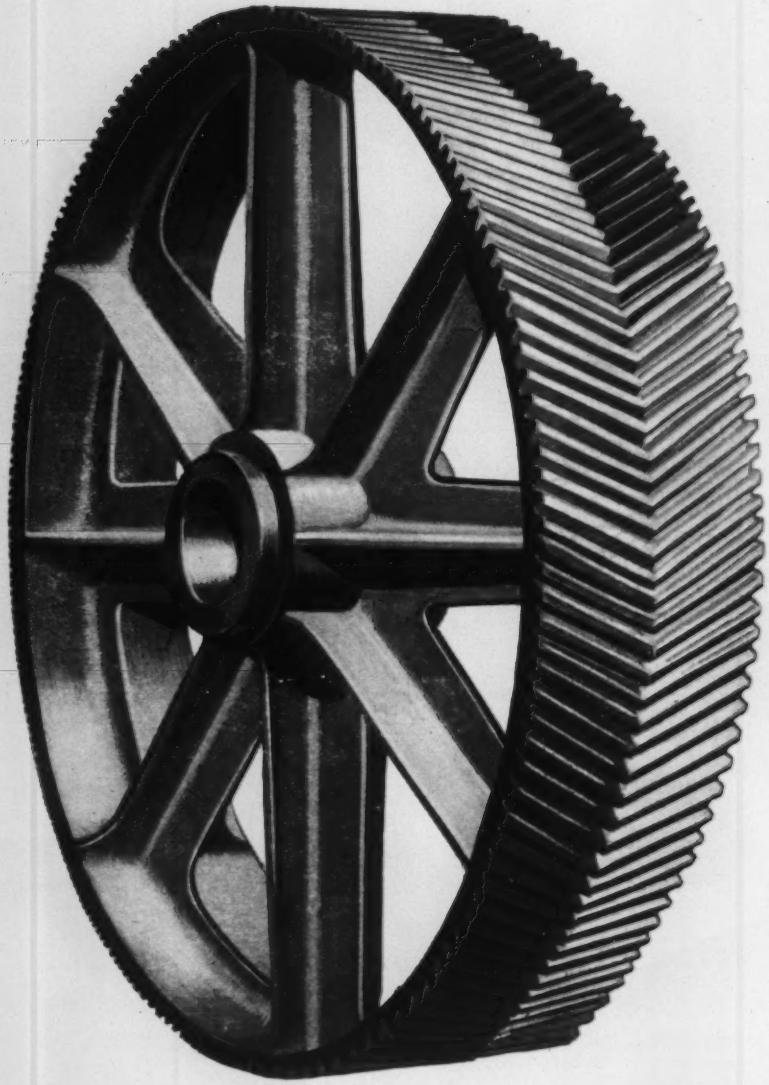
arwood

ARWOOD CORPORATION • 327 West 44th Street, New York 36, New York

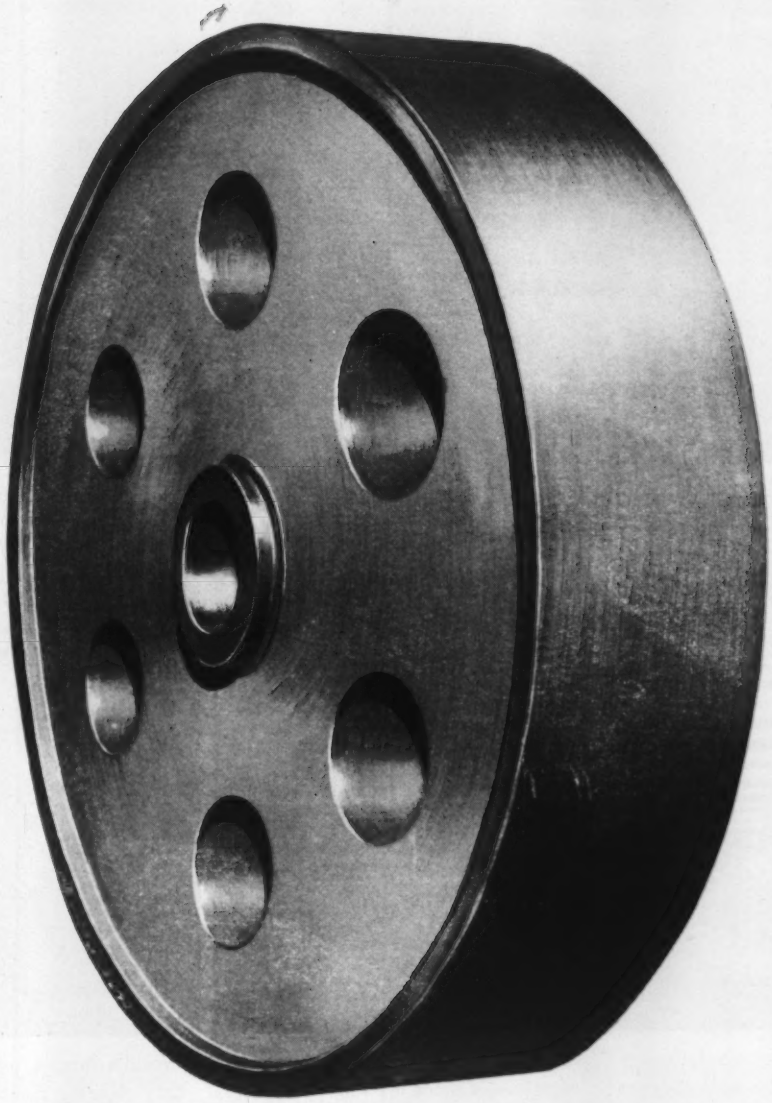
PLANTS IN BROOKLYN, N. Y.; TILTON, N. H.; GROTON, CONN.; LOS ANGELES AND LA VERNE, CALIF.

LIKE TO LEARN MORE ABOUT INVESTMENT CASTING?

Write us for a complimentary copy of our 44-page manual, "Practical Guide to Investment Casting." Among other sections it includes practical tips on designing for investment casting, as well as analyses and physical and mechanical properties of all the metals and alloys cast by Arwood.



THE BEST WAY TO CUT THE COST OF A CAST GEAR LIKE THIS...

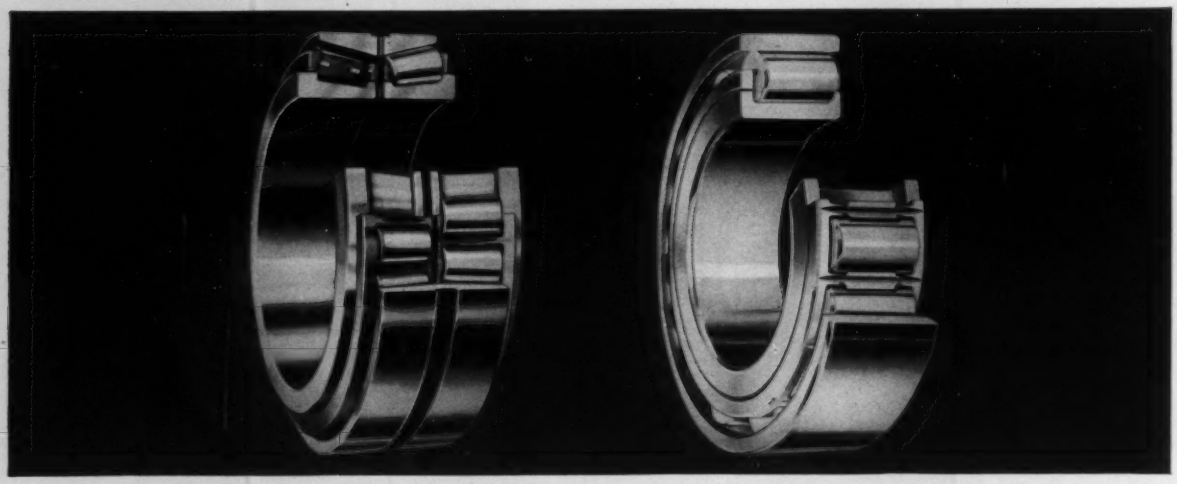


IS TO START WITH AN ALCO FABRICATED GEAR-BLANK LIKE THIS

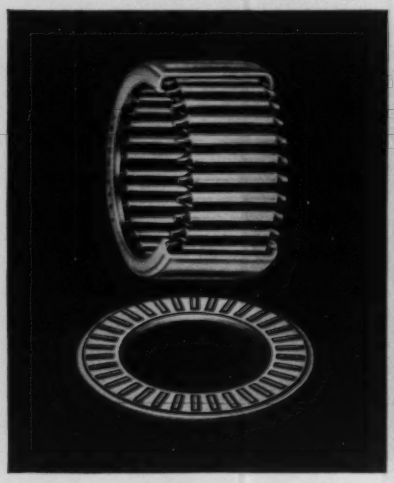
ALCO's Hi-Qua-Led Steel® forged and rolled rims now make fabricated gears less expensive than cast gears. Hi-Qua-Led, with lead added by a special process, lowers machining time as much as 50%, extends tool life many times. Costly repairs of casting defects are eliminated. Besides lower cost, you end up with all the advantages of a forged gear—maximum strength, toughness and fatigue resistance. Hi-Qua-Led forged and rolled gear blanks are available in any steel analysis, from 18 to 160 in. OD and to 24 in. wide. For more information write to ALCO Products, Inc., Dept. 1502, Schenectady 1, N.Y.

ALCO **ALCO PRODUCTS, INC.** *Product quality comes first*

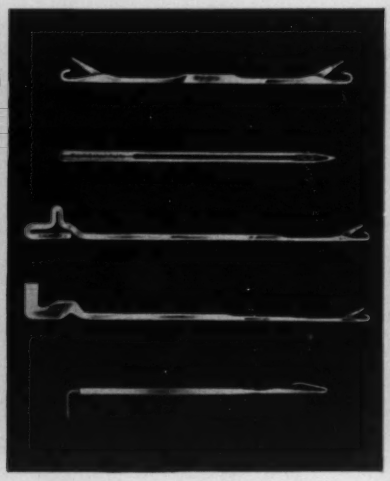
YES, TORRINGTON IS A LEADER IN THE PRODUCTION OF TAPERED AND RADIAL ROLLER BEARINGS...



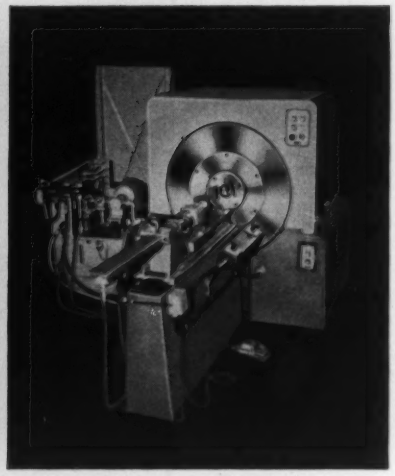
BUT THIS, TOO, IS TORRINGTON...



Pioneer maker of the revolutionary needle bearing and needle thrust bearing, widely used in a variety of products including jets, missiles and rockets where space is at a premium.



Since 1866 America's largest producer of precision-made machine needles for every need—knitting, sewing, tufting, felting—and a leading manufacturer of surgeons needles.



World's largest manufacturer of rotary swaging machines for fast, economical chipless machining in the production of metal parts for thousands of uses throughout industry.

In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

Serving industry from plants located in the United States, Canada, England, Germany and Italy

Charging-Box Cars...

built to last by a company that uses them!

5 unique structural features make them better

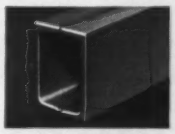
Charging-box cars have to take a lot of punishment. And, in the 40 years we have been making charging-box cars for our own use, United States Steel has developed several features in structural design that assure longer life, less maintenance, and dependable service.

As illustrated in the typical four-box car shown here, the advantages of these design features—plus the rugged durability of all-welded *rolled* steel construction—make any size USS Charging-Box Car a profitable investment.

Our representatives will be pleased to call at your convenience to discuss your requirements for this or any other type of industrial car. For more information, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal and Iron Division • United States Steel Export Company

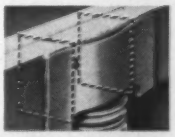
USS TRADEMARK **United States Steel**



Box girder construction: Two channel sections, welded toe-to-toe, provide a frame far stronger than the ordinary angle or channel frame. This box frame is used under both the sides and ends of the car.

Double center sills: *Two* channels, back to back, run the entire length of the car. All cross members are welded to these sills, providing superior longitudinal rigidity.

X-frame bracing: These cross braces tie the box girder frame and the center sills together for additional strength and rigidity.



Spring pockets: Over each wheel, pockets are built into the bottom of the frame and "boxed in" on all sides. Coil springs are set into these pockets. This construction permits vertical, but no lateral, movement of the springs.

Long-shanked couplers: Pivot points of couplers are *behind* each axle. This permits turning the car on a short radius curve with less wheel flange pressure than with a short-shanked coupler.

Steel

AL

ARMCO

BETHLEHEM STEEL

FORD MOTOR CO.

INLAND

JESSOP

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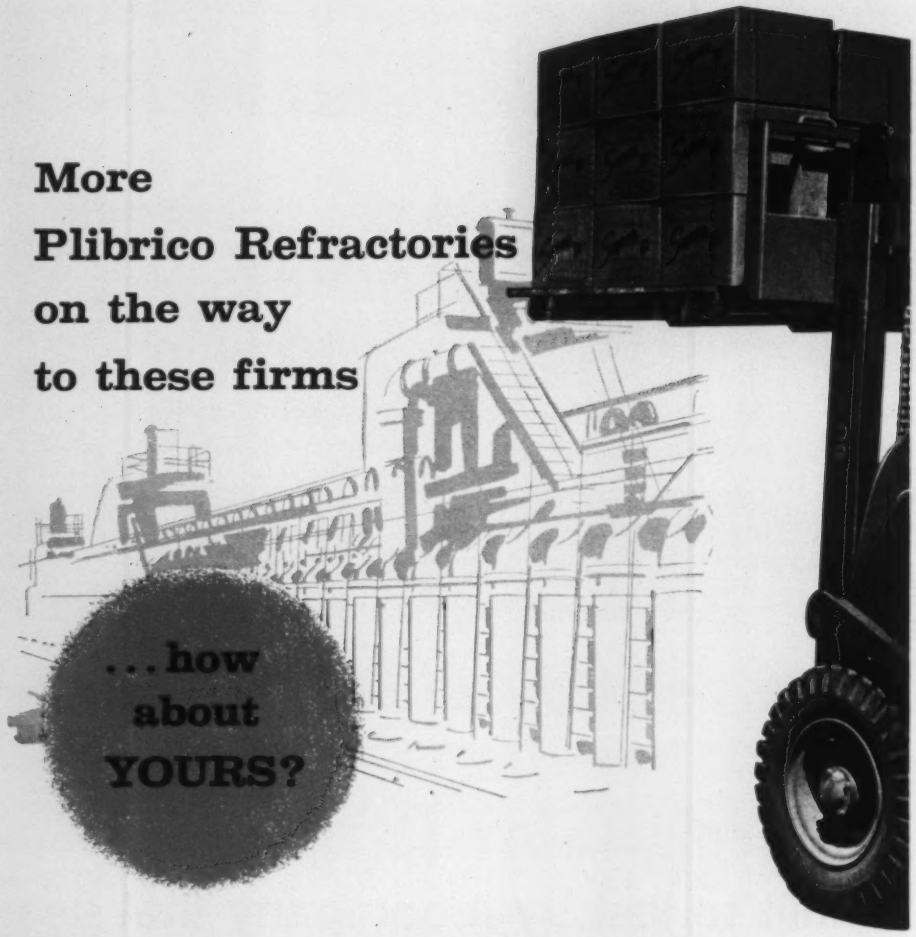
TIMKEN

USS

More Plibrico Refractories on the way to these firms



... how about YOURS?

Today's producers of steel leave nothing to chance when they select a Plibrico product that's precisely matched to their service requirements.

Plibrico has a wide selection of plastics, castables, ramming and gunning mixes, each available in grades specifically formulated to give you just what you need ... whether it's for severe, average, or fluctuating temperatures ... mechanical or thermal shock ... extreme abrasion or gaseous acid penetration ... high insulating efficiency ... load bearing strength, or any other need.

Pioneers in monolithic refractories, Plibrico also offers you the experience of their engineering department and trained installation crews to give you a completely reliable and integrated service.

SINCE 1914—PIONEERS IN REFRACTORY SPECIALTIES

REFRACTORIES INCINERATORS ENGINEERING CONSTRUCTION

Plibrico

PLIBRICO COMPANY

1806 North Kingsbury Street, Chicago 14, Illinois

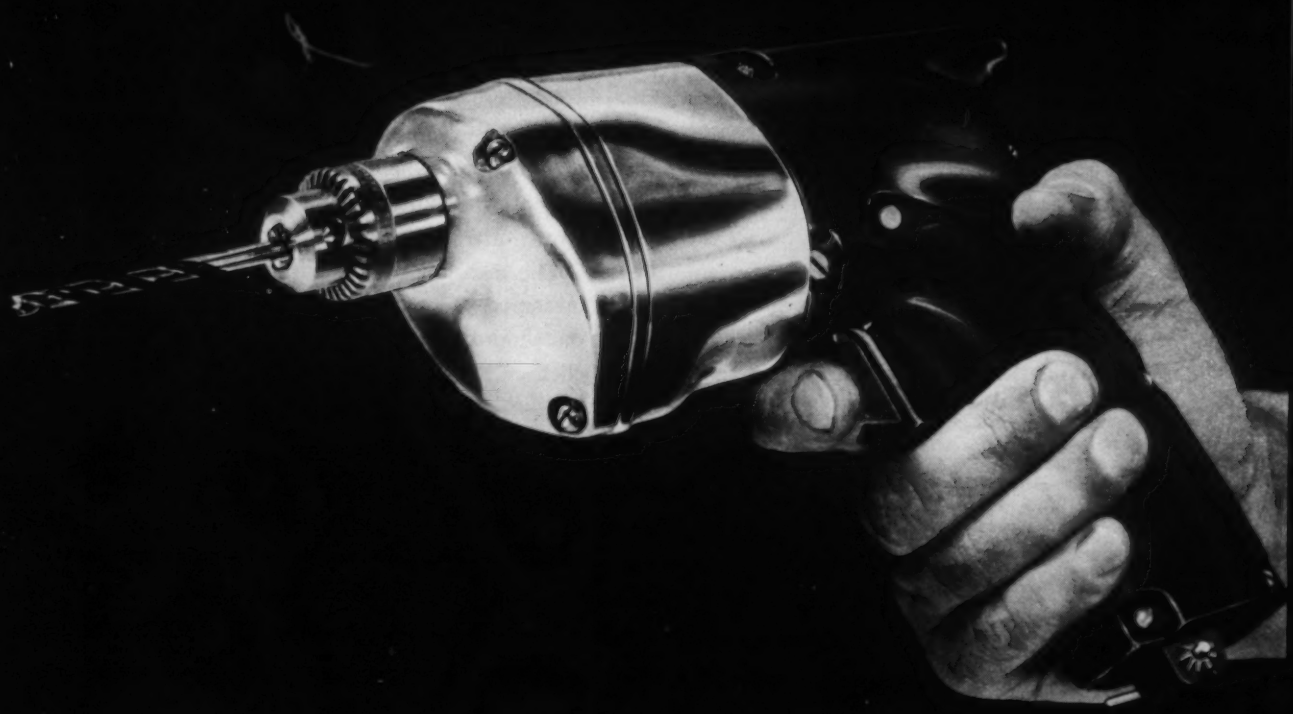
Canadian Plant: New Toronto, Ontario

Sales and Service Throughout the World

1202

CATALOGS 68 & 71 cover plastics, ramming mixes and castables giving advantages and applications.

TEAMWORK BEATS SCHEDULE IN MARKETING FIRST CORDLESS DRILL



DIES DESIGNED AND CASTINGS DELIVERED IN THREE WEEKS BY DOEHLER-JARVIS!

A 'breakthrough' product means a race against time. Get it in production and on the market while it is still "hot" news.

That was the situation Black and Decker faced in developing the first "cordless" electric drill.

A major time factor—the design and construction of dies and the die casting of three major elements of the revolutionary new product.

The question put to Doehler-Jarvis—can you design and build the dies and deliver aluminum castings for the gear case, gear case cover and field case in three weeks?

The answer—we did it!

The first delivery of completed castings was made in three days less than three weeks.

This is *not* a routine situation. But it is an outstanding example of how Doehler-Jarvis' 57 years of leadership in die casting can work to your benefit in all circumstances. It was the design and engineering skill and experience of Doehler-Jarvis, together with their unmatched production facilities and know-how which helped Black and Decker meet its ultra-tight production schedule.

But there was more to gain than speed. The die cast parts delivered to Black and Decker have the high strength, impact resistance and abrasion resistance needed to take rough handling; they are sound and dimensionally stable to permit and maintain close tolerance; and their attractive finish adds extra sales value.

You will find it to your advantage to talk to Doehler-Jarvis about die castings for your products. Contact the office nearest you.

Doehler-Jarvis

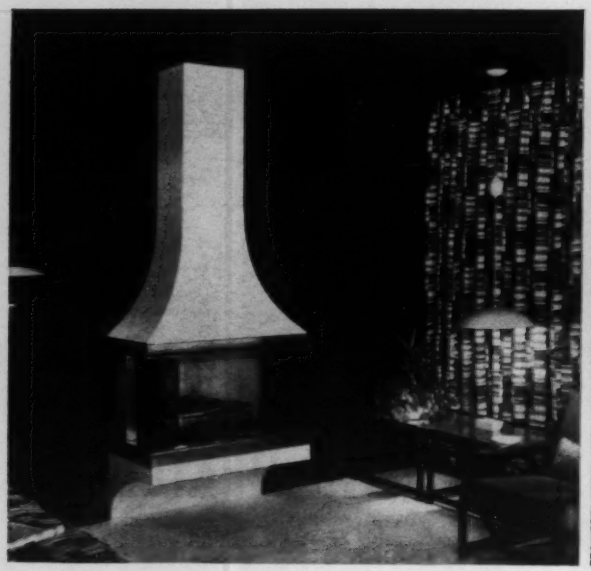
Division of National Lead Company • General Offices: Toledo 1, Ohio
Plants and Sales Offices: Toledo, Ohio; Grand Rapids, Michigan; Pottstown, Pennsylvania; Batavia, New York.
In Canada: Barber Die Casting Co., Ltd., Hamilton, Ontario.
In Brazil: Industrias Doehler do Brasil, S. A., Sao Bernardo do Campo, Sao Paulo.
In Argentina: Doehler Argentina, S. A., Buenos Aires.
In Great Britain: Metal Castings-Doehler, Ltd., Worcester, England.

Want a sales edge in the market?

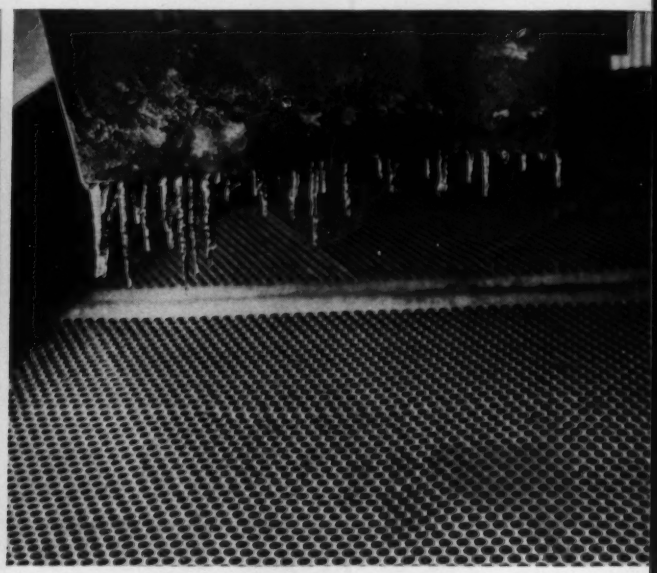
Durability and Stainless Steel enjoy an association that started years ago. In fact, some of the earlier applications of Stainless Steel are still around today, shining examples of real durability. This is a key point: the products are still serving today, and the *primary* point is that the people who purchased them are satisfied.

To provide the market with a product that satisfies is simply good business. It is in this vital product planning area where Stainless Steel can deliver the edge. It will hold up. It provides durability. It is strong, attractive, corrosion resistant.

The decision to swing to Stainless Steel takes measured judgment. It is not an impulse item. It costs more than ordinary materials, but to repeat a cliché, "First cost isn't everything." After all, an



Stainless brightens your home . . . This gleaming Stainless fireplace will last for the lifetime of the home it graces. It will *keep* its gleam, too, because Stainless doesn't corrode and it can be wiped clean with a damp cloth. This maintenance-free fireplace by Vega Industries, Inc., Syracuse, New York, can be installed in less than one day, in any room in the house, whether the home is new or old. Because of its Stainless Steel construction, installation costs are cut as much as fifty per cent.



Stainless Steel works in the coal mine . . . Coal screens, where coal is graded or cleaned, take a daily battering. They are subject to strong acids and water. If they are Stainless, there's no problem. Strong Stainless stands up to rough handling, and its superior corrosion resistance eliminates one of mining's biggest headaches. Stainless Steel screens last many times longer than screens of other materials, making it one of the industry's best investments.

Order Stainless Steel from your nearest Steel Service Center.

Get it with durable USS Stainless Steel

improved product, durability and possibly more market satisfaction deserve consideration. If you feel inclined to learn more about the proper grade of Stainless Steel for your products, write, wire or phone. There is an opportunity in the market today for the durability that Stainless Steel can deliver. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

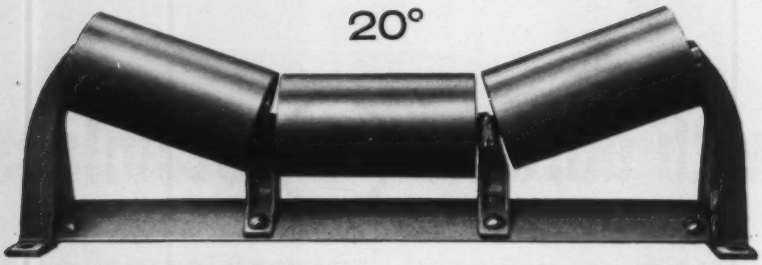
Ever hear of a Stainless trailer wearing out? Nobody ever did. Are they durable? Once a Stainless Steel trailer loaded with lamp black caught fire. Cargo and tires burned up. But not the Stainless Steel. They put new running gears on it and it was as good as new. Since Stainless is so strong, this Fruehauf Trailer is lighter and can carry bigger payloads. Since Stainless resists corrosion, painting is unnecessary, and corrosive road salts or harsh industrial atmospheres are never a problem.

. . . and in the ice cream parlor. If you want your restaurant equipment to be attractive as well as long-lasting, make sure it's Stainless. Here is an all-steel unit that includes an ice cabinet, walk-in cooler, beverage dispensers and syrup rail. Its gleaming Stainless front is easy to keep sanitary. Cleaning agents won't harm it and it will *stay* bright and shiny. All the best restaurants (and home kitchens as well) use Stainless Steel for long life, cleaning ease, attractive appearance. This all-steel unit was manufactured by Erickson Industries of River Falls, Wisconsin.

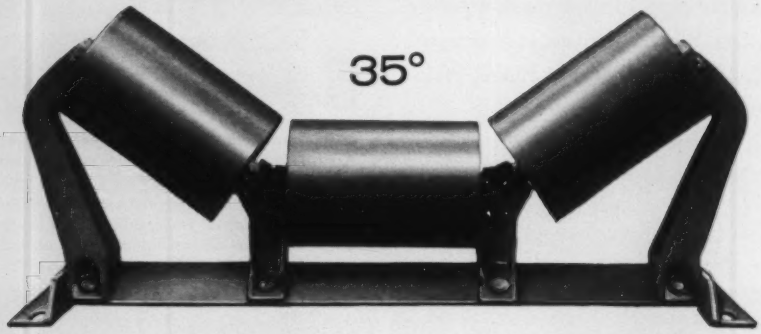
Stainless welcomes your customers . . . This door is Stainless Steel. It creates a first impression that counts—sets off the business man who is proud of his firm. Stainless gives store fronts a quality look. Stainless keeps its good looks, too. The rainfall washes it clean. Stainless Steel's strength, attractive appearance and corrosion resistance make it ideal for outdoor locations. Stainless Steel doors are the *best* doors.

United States Steel USS

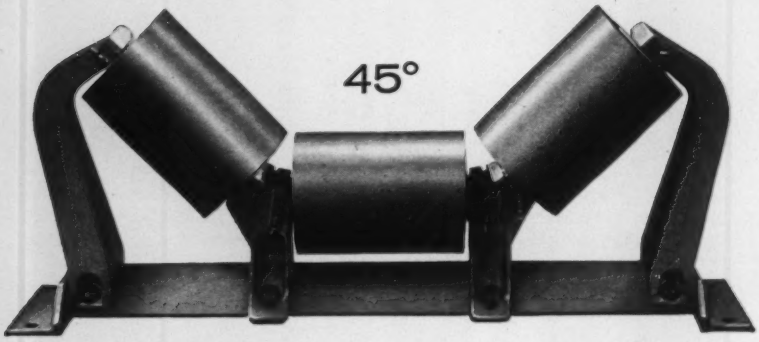
TRADEMARK



which PERMASEAL® idler



is best for your job?



There's a PERMASEAL Idler to perfectly match your belt conveyor requirements. A broad line, plus skilled engineering help, enables you to select the idler that exactly meets your needs. No need to over- or under-design. Power requirements are minimized. Double, flexible diaphragm seals keep grease in the rolls, dirt out. Protect bearings for years. Accurate roll alignment and rugged construction provide long maintenance-free life for idlers, as well as conveyor belts.

PERMASEAL Medium Duty Idlers are available with end rolls inclined at 20°, 35° and 45°; Heavy Duty Idlers at 20° and 35°. In addition to the standard troughing idlers shown here, the PERMASEAL line includes Picking Belt Idlers, Impact Absorption Troughing Idlers, Flat Belt Carrying Idlers and Return Idlers—all types and sizes, for general and extra-heavy duty service. PERMASEAL Idlers handle belt widths up to 72".

Call your nearest Jeffrey distributor, or write for Belt Idler Catalog 996. The Jeffrey Manufacturing Company, 889 North Fourth St., Columbus 16, Ohio.

JEFFREY

If it's conveyed, processed or mined, it's a job for Jeffrey

J & L Steel Service Centers—efficient and dependable. Production slitting is custom slitting at the Department Stores of Steel. Sharp slitter knives minimize burrs. Continual gauge checks assure uniformity. Coils are packaged and shipped to arrive damage-free, ready for immediate use. *Every* order at J & L gets this kind of *extra* care—thanks to modern machinery, advanced methods and skilled warehousemen. That's why it pays to call J & L for *all* your needs —carbon steel, specialty steels or stainless.

Take advantage of the streamlined, time-saver service J & L offers. Count on the Department Stores of Steel. You'll get exactly what you want—when you want it.

J & L Steel Warehouse Division

CHICAGO • CINCINNATI • CLEVELAND • DETROIT
HAMMOND • INDIANAPOLIS • LANCASTER • LOUISVILLE • MEMPHIS
NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH

Three great names in couplings

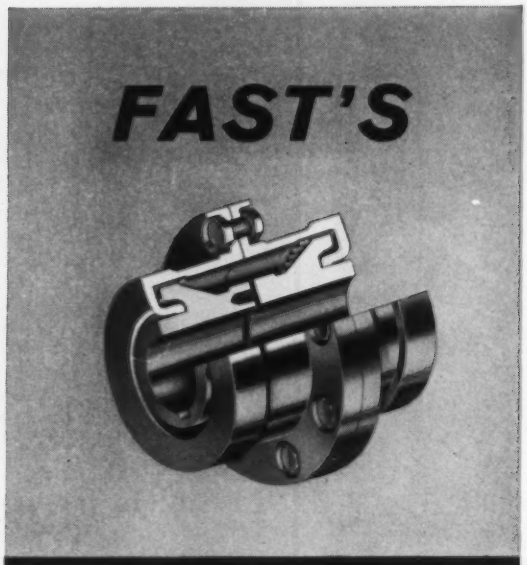
NOW CARRY THIS CORPORATE SYMBOL

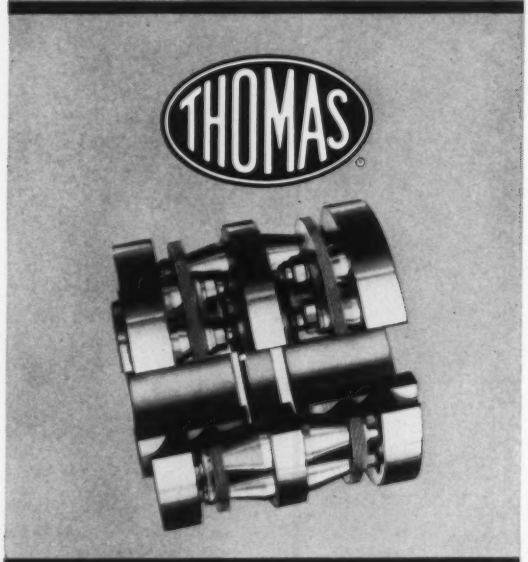
KOPPERS®

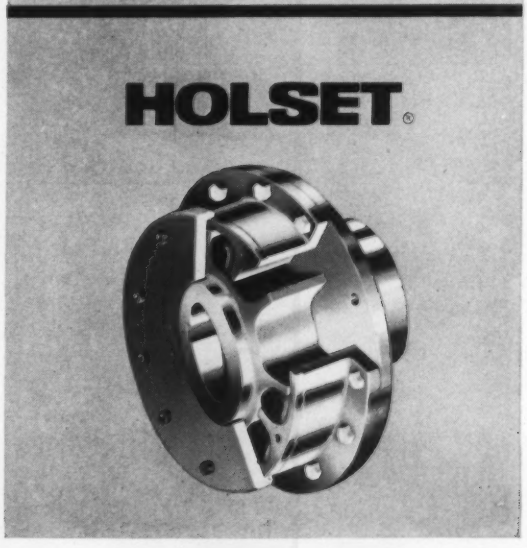
With the acquisition of the Thomas Flexible Disc Coupling line, Koppers now provides engineering solutions to a wide range of industrial coupling problems. Need a lubricated gear-type coupling for transmitting high loads? Koppers world-famous Fast's coupling line does the job on shafts up to 32 inches. Need a maintenance-free flexible-disc coupling with no backlash? The highly engineered Thomas line holds the answer—with miniature couplings as small as 1/12th of an ounce. Need a coupling to absorb impact or vibration? The Holset line of resilient, non-lubricated couplings protects equipment in most diesel, compressor and shock load applications.

Because each of these coupling lines has its particular application in industry . . . and because each is a recognized name in the power transmission field . . . you can continue to buy them by brand—just as you have in the past. Of considerable importance are the experienced, extensive engineering and manufacturing services of the entire Koppers organization that are available to help you with your power transmission problems . . . in any size, in any quantity, for any use.

KOPPERS COMPANY, INC.
COUPLING DEPARTMENT
Baltimore, Md. • Warren, Pa.
Engineered Products Sold with Service







HARBISON-WALKER GUNNING, RAMMING AND CASTING REFRACTORIES

A BRAND FOR EVERY SERVICE

GUNNING	RAMMING	CASTING*
	Corundum Ramming Mix	
	Korundal Ramming Mix	
	Coralite Ramming Mix Coralite Plastic Refractory	H-W Lightweight Castable 33
Castolast G	H-W Mullite Ramming Mix H-W Mullite Plastic Refractory	H-W Castolast
Apache Gun Clay	Apache Plastic Refractory	H-W High-Alumina Castable
H-W Chromepak H-W Super Gun Clay	Apachite Plastic Refractory H-W Super Plastic Fire Brick	H-W Lightweight Castable 30
H-W Harcast BF	Coral Ramming Mix H-W Black Patch	
H-W Kuplomix H-W Standard Gun Clay	H-W Standard Plastic Fire Brick	H-W Lightweight Castable 28 H-W Harcast
		H-W Super Castable
H-W Harchrome G		H-W Chrome Castable H-W Harchrome Castable H-W Lightweight Castable 26 H-W Extra Strength Castable LI
		H-W Standard Castable H-W Baffle Mix
		H-W Extra Strength Castable
		H-W Lightweight Castable Extra Strength
		H-W Low-Iron Lightweight Castable 22 H-W Lightweight Castable 22
		H-W Lightweight Castable 20
		H-W Lightweight Castable 10 H-W RC Castable

*These products may also be gunned.

A complete series of gunning, ramming and casting refractories is available from Harbison-Walker to meet every furnace operating condition and temperature requirement. Harbison-Walker engineers will help you select the proper brands to assure best balanced service life. Write us for complete details.

TYPICAL FURNACE APPLICATIONS: ARCHES · ASH PITS · BOILER SETTINGS BREECHINGS · BURNER BLOCKS · BAFFLES · CATALYTIC REACTORS · DOOR LININGS · DUCTS AND PIPING · ELECTRIC FURNACE ROOFS · HEARTHS INSULATION · KILNS AND CARS · LADLE LININGS · ROTARY KILN CHAIN SECTIONS, HOODS, COOLERS AND DUST CHAMBERS · SOAKING PIT COVERS INDUCTION FURNACE LININGS

HARBISON-WALKER REFRACTORIES CO. AND SUBSIDIARIES *World's Most Complete Refractories Service*

GENERAL OFFICES: PITTSBURGH 22, PENNA.

HARBISON-WALKER MONOLITHIC REFRACTORIES

Now packaged for easy handling and time saving on job site

Newly-designed square-end bags, zip-open cartons and sturdy steel drums provide users of Harbison-Walker's monolithic refractories with easy handling, better palletizing and efficient storage advantages. A distinctive color for each brand speeds product identification on the job site.

The bags for packaging castables are made of sturdy, multi-wall, moisture-proof material. Brand names and mixing directions are clearly printed on each bag. The easy-to-handle zip-open cartons contain plastic refractory slabs wrapped in polyethylene moisture-proof material, insuring good shelf life. The results—besides easy and efficient handling—substantial savings of time and labor in installation.

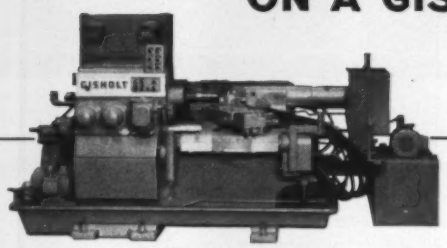
HARBISON-WALKER REFRACTORIES CO. AND SUBSIDIARIES *World's Most Complete Refractories Service*

GENERAL OFFICES: PITTSBURGH 22, PENNA.

HW 61-15

Do it for less

ON A GISHOLT AUTOMATIC



MASTERLINE No. 12
Automatic Chucking Lathe
Horizontal model shown—
vertical model and larger No. 24 offered.

Practical for small lots and production runs.

Rugged construction, ease of control, and fast setup.

Add a single- or multiple-pass JETracer to reduce tool costs, setup and inspection time, and increase versatility.

If *your* "lost order reviews" dictate more automatic machining operations . . . you'll be surprised and relieved to see how easy it is to cut costs with a Gisholt No. 12 Automatic Production Lathe. New, faster setup methods assure maximum profit on short runs and the speed, capacity and horsepower have been increased to give you maximum production with carbides.

Add a JETracer and complex jobs can be handled during the automatic cycle. Contact Gisholt if you want to do it for less.

GISHOLT®
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

First from LeBlond Continuous-Path Tape Controlled Lathes

Talk to LeBlond about Tape-Turn lathes. You'll be talking about machines we've got on the run off floor rather than on the drawing board. We're delivering at least six months ahead of competition. Our experience can help you get an important edge on *your* competition.

Tape-Turn is being built with 20 to 75 hp in sizes from 2013 to 4025.

100% tape commanded by G. E. Mark Century control—*all* operator controls at the console—solid state components (no tubes, stepping switches or rotating parts)—temperature and humidity controlled—built-in computer for linear and circular interpolation.

Benefits:—increased efficiency and management control, reduced lead time, a permanent record in easily-stored form, low-cost quality control, reduced parts inventory, shorter set-up time and lower tooling costs.

Ask to have a LeBlond engineer stop and talk Tape-Turn, the machine on the floor instead of the drawing board. Or write for our new descriptive bulletin TT-1061 B.

LeBLOND of Cincinnati

The R. K. LeBlond Machine Tool Company, Cincinnati 8, Ohio

Leading the way in numerically-controlled turning.

The Big Labor Issues

The auto labor negotiations are proving three things:

1. The United Auto Workers is forced to allow some home rule to provide safety valves through which local steam can escape.
2. Despite the headlines, profit sharing won't be a major issue in the future.
3. Government pressure will be a big issue in coming contract parleys.

• **Home Rule**—The UAW leadership has taken note of past Steelworker rebellions, the refusals of some locals to go along with decisions by the IUE international, and even the defections within the Teamsters. Its answer is to allow the locals more voice in their own contracts. That explains the many local strikes against General Motors Corp. last week despite provisional agreement on the national economic package.

• **Profit Sharing**—Although Walter Reuther showed reluctance in withdrawing his profit sharing demand on the Big Three, the UAW president didn't seriously want it extended beyond American Motors Corp. He's not sure it will work. Profit sharing shows up brilliantly in some cases, fails in others. General Electric Co., for example, tried it twice and finally abandoned it.

When successful, it's usually in a middle sized or small company with a relatively undiversified line of products. The approach also works best with a growth firm, such as AMC. Most labor leaders look askance at such employee participation because it could tend to make workers oriented more toward management than union viewpoints.

Mr. Reuther overrode that objection because he needed a gimmick. He found one in the AMC plan and used it as a tactical device. Our guess is that he'll demand it sparingly in the future, concentrating on the smaller growth companies. Look for other metalworking unions to demand profit sharing even less frequently than the UAW.

• **Government Pressure**—Among those who sang the praises of AMC's contract were President Kennedy and Labor Secretary Arthur Goldberg. We suspect their approval was similar to Mr. Reuther's. They saw the settlement primarily as a convenient lever to help force agreement elsewhere. Washington pressure to that end was quiet and behind the scenes. The technique was not action, but threat of action. It was effective in preventing a national strike, but not in warding off local walkouts.

The government's role in bargaining is the largest it has been since World War II. The desire for home rule is also increasingly strong, especially within the big unions. They will be the real issues in coming labor negotiations.

John S. Morgan

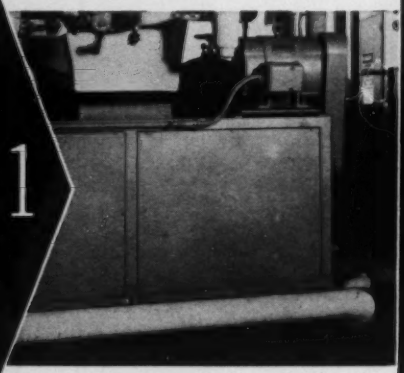
ASSOCIATE MANAGING EDITOR

AAF keeps white-room

3-step air system demonstrates AAF's capability for complete air engineering

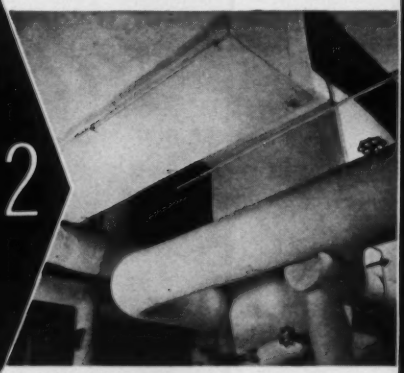
AIR FROM C. P. CLARE GENERAL OFFICE (already cleaned by AAF Electro-Matic precipitator) is cleaned again by AAF Electro-PL filters before it enters the air conditioning unit serving the white room.

1



AAF KENNARD/NELSON HIGH-PRESSURE AIR CONDITIONING UNIT controls white room humidity and maintains a temperature of 72° at all times. (To offset heat from manufacturing processes, the air is changed completely every three minutes.)

2



AIR ACTUALLY ENTERING WHITE ROOM is filtered by AAF high-efficiency Type F filters enclosed in the duct running from the outlet of the air conditioning unit to the white room.

3

White room operations involving the assembly of electrical relays demand ultra-clean air and rigidly controlled temperature and humidity. The planners of the new addition at C. P. Clare Co., Chicago, determined that their white room should have a complete air system all its own. Logically, they turned to AAF.

Result: white-room air to white-room standards —99.97% dust-free, constant 72° temperature and accurately controlled humidity.

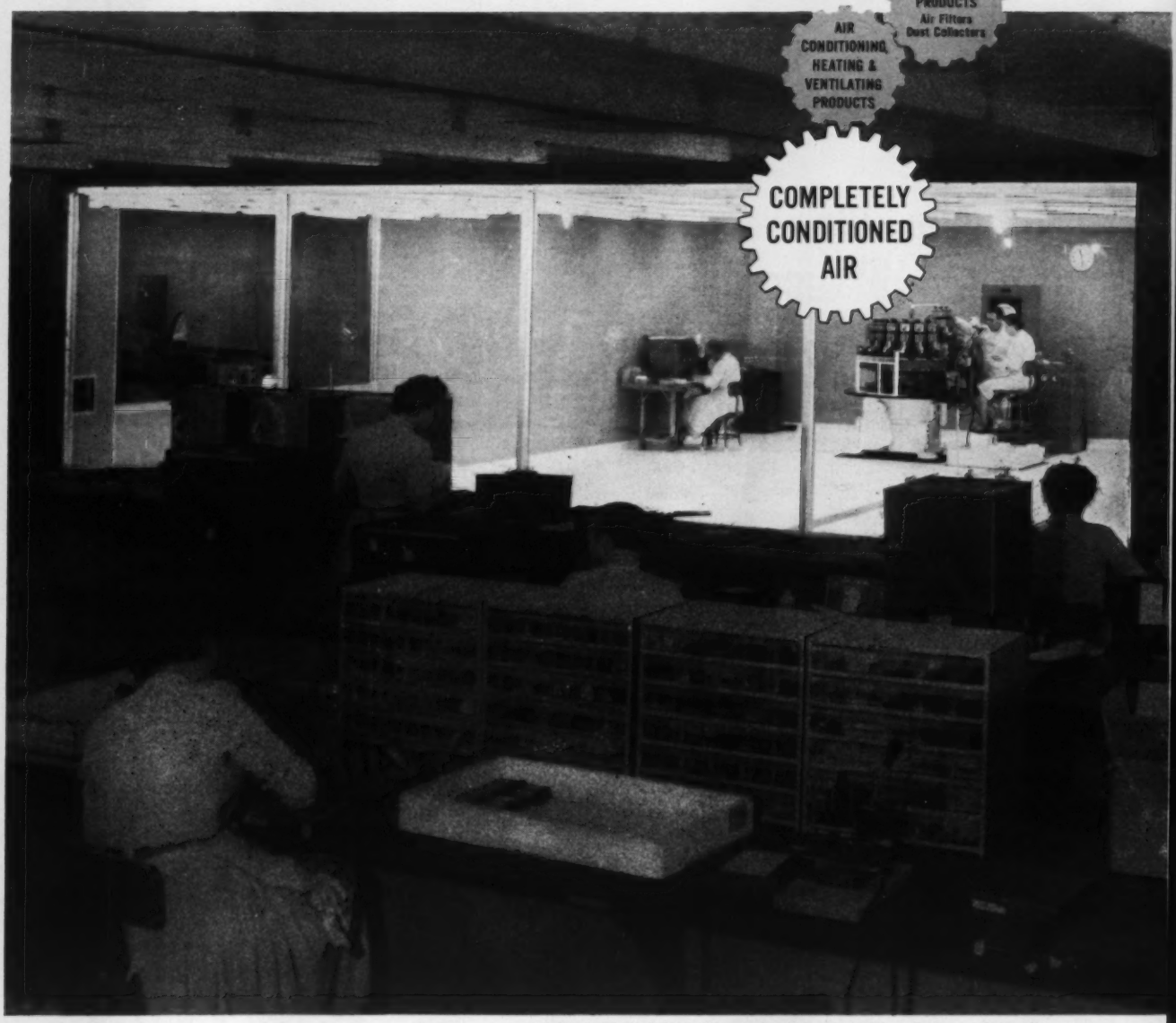
AAF is the one company that provides all the major components for completely conditioned air. And, just as important, AAF offers the knowledge and experience to coordinate their functioning into one custom-engineered system.

Booklet 518 describes the complete line of American Air Filter component products. If you would like a free copy, address Richard W. Smith, American Air Filter Company, Inc., 443 Central Avenue, Louisville, Kentucky. In Canada, address: American Air Filter of Canada, Ltd., 400 Stinson Blvd., Montreal 9, Quebec.

AAF **American Air Filter**

BETTER AIR IS OUR BUSINESS

air "*in the pink*"!

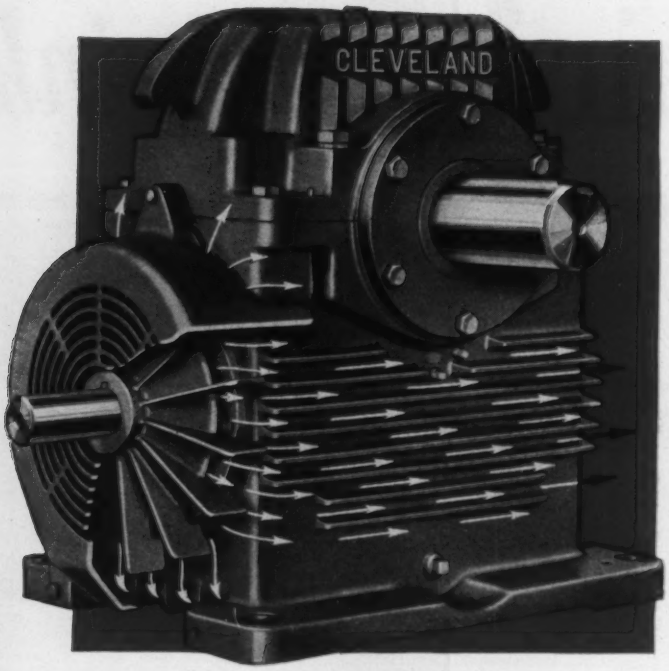


Architects: Rapp & Rapp, Chicago; Consulting Engineers: J. P. Bazzoni & Co., Chicago.

AAF products for complete air engineering

AIR CLEANING: (Atmospheric Dust) *AAF electronic air cleaners,* automatic air filters, *unit filters,* engine & compressor filters. (Process Dust) electrostatic precipitators, wet-type collectors, dry-type collectors, fabric arresters. AIR CONDITIONING, HEATING & VENTILATING: Herman Nelson air conditioning unit ventilators, unit ventilators, portable heaters; Kennard/Nelson dual-duct air conditioning units, multi-zone air conditioning units, *packaged central station air handling units,* sprayed-coil dehumidifiers, fan-coil units, packaged liquid chillers, cooling towers, evaporative condensers, direct-expansion coils, water coils, steam coils, unit blowers, industrial exhausters, centrifugal fans, unit heaters, radiation products; Illinois traps, valves, specialties, heating systems and controls.

● *Italics denote products used in C. P. Clare white room.*



Fan cooling for Increased HP Capacity is Not New... *to users of Cleveland Speed Reducers*

As far back as 1944, Cleveland Speedaire Worm Gear Reducers (shown in both the announcement ad and cutaway photo below) were providing industry twice the load carrying capacity then available from standard worm gear units of equal frame size. Even then, it was *fan cooling* that did the trick—because fan cooling was and still is the most practical method of heat dissipation.

On the new, higher horsepower Cleveland's (shown in top cutaway photo), a small, specially designed fan—equally effective in either direction of rotation—is located on the worm shaft's input side. Fan size and design permit a smooth, more effective flow of air beneath, above, and around all sides of the reducer.

Mounting the cooling fan on the worm shaft INPUT end is a very definite Cleveland advantage for when the fan is mounted on the *opposite* side, a second oil seal is needed. This results in additional friction loss due to seal drag—and is another point where oil leakage could occur.

Remember, it was Cleveland design engineers who pioneered both fan cooling and centrifugal casting of bronze gears—and after sixteen years of rugged field usage in all types of industrial plants, have now incorporated these features in all units (from 3 to 12-inch centers) of the new standard Cleveland Speed Reducer line.

Get the story of these new speed reducers from your Cleveland representative, or write today for free 36-page illustrated Bulletin No. 410 that contains complete engineering information. Either way, you will get the answer to improved speed transmission—at savings of 50% or more on per horsepower cost!

A 1944 CLEVELAND AD
"Announcing A Fan-Cooled Worm Gear Speed Reducer ... SPEEDAIRE."

CLEVELAND
Worm Gear
Speed Reducers

Cleveland Worm & Gear Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

New Plant and Equipment Spending

Seasonally Adjusted Annual Rates (Billions of dollars)

	1961			
	Jan.-Mar.	Apr.-June	July-Sept.*	Oct.-Dec.*
Manufacturing	13.75	13.50	13.75	14.20
Durable Goods Industries	6.50	6.20	6.15	6.35
Primary Iron & Steel	1.35	1.05	1.15	1.10
Primary Nonferrous Metals	0.30	0.25	0.25	0.25
Electrical Machinery & Equipment	0.70	0.70	0.65	0.65
Machinery, Except Electrical	1.15	1.10	1.05	1.10
Motor Vehicles & Equipment	0.70	0.80	0.80	0.80
Transportation Equipment, Excluding Motor Vehicles	0.40	0.40	0.35	0.40
Nondurable Goods Industries	7.25	7.30	7.65	7.85
Food & Beverages	0.95	0.90	1.00	1.05
Textile Mill Products	0.50	0.45	0.50	0.55
Paper & Allied Products	0.75	0.70	0.75	0.70
Chemicals & Allied Products	1.50	1.65	1.70	1.70
Petroleum & Coal Products	2.70	2.75	2.80	2.85
Mining	0.95	1.00	0.95	1.05
Railroads	0.70	0.70	0.60	0.50
Transportation, Other than Rail	1.75	1.80	2.05	1.90
Public Utilities	5.35	5.50	5.95	6.05
Commercial	11.30	11.05	11.50	12.20
TOTALS	33.85	33.50	34.80	35.90

*Estimates.
Source: U. S. Department of Commerce.
Note: Details may not add to totals due to rounding.

Capital Spending Holds Upward Trend

INDUSTRY'S plans for capital expenditures in the fourth quarter are expected to push the spending rate to $35.90 billion. That's the third highest rate since the record third quarter of 1957.

Of the six major categories measured by the U. S. Department of Commerce, only railroads and transportation other than rail will show seasonally adjusted declines in the fourth quarter.

The nation's railroads anticipate almost a 40 per cent drop from last year's outlays.

Nondurable goods manufacturers indicate vigorous investment activity this year. All groups, except textiles, paper, and rubber, plan to make larger expenditures in 1961 vs. 1960. Others going up: Gas and electric companies, pipelines, airlines, and commercial firms.

With the exception of machinery groups, all durable goods makers will invest less in 1961 than they did in 1960. Total investment by manufacturers of durables will decline from last year's $7.2 billion to $6.3 billion. The sharpest drop is indicated by iron and steel companies which look to spend about 30 per cent less this year than last.

The bottom of the trough in spending occurred in the first and second quarters, and those lows will serve to pull capital investment down 3 per cent below the 1960 level of $35.68 billion.

Big Problem in Auto Labor: Getting the Locals in Line

LOOK FOR a wave of walkouts over local issues at Ford Motor Co. and Chrysler Corp.

Like General Motors Corp., the other two will be able to reach agreement on a national economic package before they can settle on the noneconomic issues.

• **What's the Trouble?**—The local strikes occur for two reasons:

1. The United Auto Workers is giving its locals a safety valve to let off steam. Walter Reuther and associates have noted the troubles with locals that big unions have had—the steelworkers with the dues rebels, the IUE with locals refusing to go along with a strike vote, the Teamsters with defecting groups. The UAW has suffered a little of that itself, primarily with skilled trades units, and wants no more. So, it's sanctioning home rule.

2. The companies are taking a firmer stand on work rules and other noneconomic matters. They feel they have been careless about the small print after the major economic issues have been settled and want to rectify the oversight. The steel companies tried the same thing in 1959 and suffered their longest strike in history. In autos, the odds are against many extended local walkouts.

• **GM's Economic Terms** — GM's provisional money terms echo the American Motors Corp. pact, except for profit sharing. The UAW says it will cost the company 12 cents a year. GM hasn't disputed the figure. The agreement runs until Aug. 31, 1964.

It provides for an annual wage increase of 6 cents an hour or 2½ per cent of the employee's wage rate, whichever is higher. An unusual feature is that 2 cents of the 1961 increase would be used to pay part of the cost of hospital-medical care so that the new improved coverage would be without employee contribution. Also, the 1 cent cost of living (C-O-L) allowance due Sept. 4, 1961, would be used toward payment of increased pensions and toward payment of half the cost of hospital-medical benefits for pensioners and their spouses. The C-O-L allowance formula of 1958 remains unchanged, and 12 of the 17 cents C-O-L allowance is transferred to the wage rate. The remaining 5 cents is continued and subject to adjustment.

Short workweek benefits would provide payment of 65 per cent of a worker's wage for any hours by which a week falls short of 40. Supplemental Unemployment Benefits (SUB) would be increased from $30 to $40 a week. Together with state unemployment compensation, the benefits would provide 62 per cent of gross pay, or nearly 80 per cent of take-home pay. In addition, there would be an allowance of $1.50 for each dependent up to a maximum of four.

• **Longer Fringes**—Pension benefits will be paid at the rate of $2.80 a month for each year of credited service. Disability and early retirement benefits are increased to $5.60 a month for each year credited service for the period when a worker would not be eligible for social security. In-hospital care will be extended 120 days to 365 days. Seventy-five per cent of future increases in those benefits would be paid by the corporation, 25 per cent by the employee. After Jan. 1, 1962, medical benefits would be continued for a worker who was laid off, at no cost to him.

Other improvements include a $500 increase on life insurance, a moving allowance, improved vacation and separation pay, and more liberal jury duty allowance.

• **Model Introduction Hurt** — GM had built 134,000 1962 models when most of its plants were struck Sept. 11. That included about 71,500 Chevrolets and Corvairs, 21,250 Pontiacs and Tempests, 18,000 Oldsmobiles and F-85s, 16,000 Buicks and Specials, and 7000 Cadillacs. GM's 1962 cars won't start going on sale officially until the week of Sept. 25, but the company ordinarily likes to have at least 300,000 in dealer showrooms by public announcement time. It will be a little short this year.

Total inventories of 1962 models of all makes probably had reached about 300,000 as of late last week, only moderately below normal levels for this season.

UAW Members Accused of Overproduction in Plant

CHARGES are being filed by the United Auto Workers, Local 971, against two members, accusing them of refusing to curtail production in excess of "normal standard for the job."

The union reportedly ordered the slowdown at the Bendix-Westinghouse Automotive Air Brake Co. plant in Elyria, Ohio, during current negotiations.

The action could mean expulsion from the union and loss of jobs.

Communication Equipment Makers Eye Sales Record

THE COMMUNICATION equipment industry is getting ready to chalk up another record year, predicts the Commerce Department. Sales in 1961 are expected to hit $3.2 billion, up about 9 per cent from 1960's.

The industry produces a variety of complex switching and transmission items for the domestic telephone, telegraph, and international radio and cable companies. Production of telephone sets is the industry's basic indicator—in 1960 output topped 9.1 million units.

These statistics are from the Business & Defense Services Administration:

Year	Sales
1961*	$3.2 billion
1960	$2.93 billion
1959	$2.65 billion
1958	$2.48 billion

*Estimated.

Import Pinch Tightens on Fitting, Flange Makers

THE $125 MILLION forged steel fitting and flange industry is feeling the tightening pinch of foreign competition. Imports, which are running about $10 million annually, are undercutting domestic products by as much as 30 per cent, industry leaders told the Business & Defense Services Administration in a recent survey.

The industry's chief competitors are Germany, Great Britain, and Italy.

Its basic problems are typical in many small U. S. industries:

1. Domestic companies must do much research and development on new products to keep pace with technological developments, such as nuclear energy.

2. Foreign competitors are taking the cream off the domestic market for off-the-shelf items.

3. Because there are so many small firms, it's difficult for the government to pinpoint problem areas. Statistics, particularly on imports, are difficult to obtain.

Officials emphasize that the importance of the industry cannot be measured in dollars—its sales cover all major defense and space systems.

• **Suggestions** — Members of the American Forged Fitting & Flange Association got some advice from the BDSA last week: Boost exports. A BDSA survey of several countries revealed these possibilities:

1. There are good export opportunities for special alloy products in the larger sizes which handle the higher pressures in oil refineries, chemical plants, and nuclear energy facilities.

2. A modern international standard for fittings and flanges may be developed which will agree with the U. S. specifications.

Big chemical and oil expansion plans in the Netherlands and Germany mean the market for U. S. standard products is increasing, and European producers face leadtimes up to six months. If U. S. producers can do the necessary marketing groundwork, they may be able to take advantage of their competition's backlog.

One export problem: Import duties on U. S. products entering the European Common Market average 19.78 per cent of value, while import duties on fittings and flanges traded within the market are now 16.04 per cent of value and are scheduled to decline steadily to nothing in the next ten years.

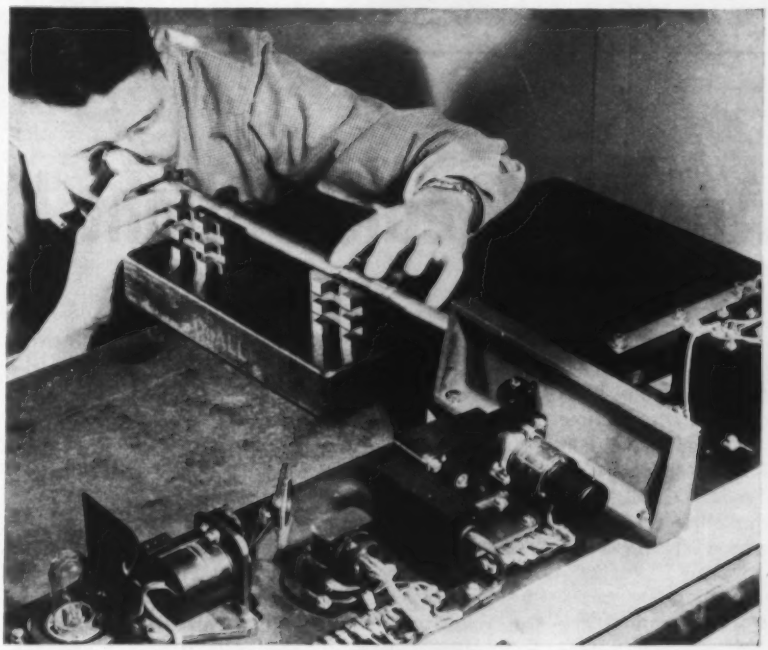
Britain exports about 50 per cent of its production yearly; Italy exports about 30 per cent; Germany exports $3 million worth to the U. S. alone.

Magnesium, Tin Plants Hit by Hurricane Carla

METALWORKING companies along the Texas coast began to send in teams late last week to survey damage caused by Hurricane Carla.

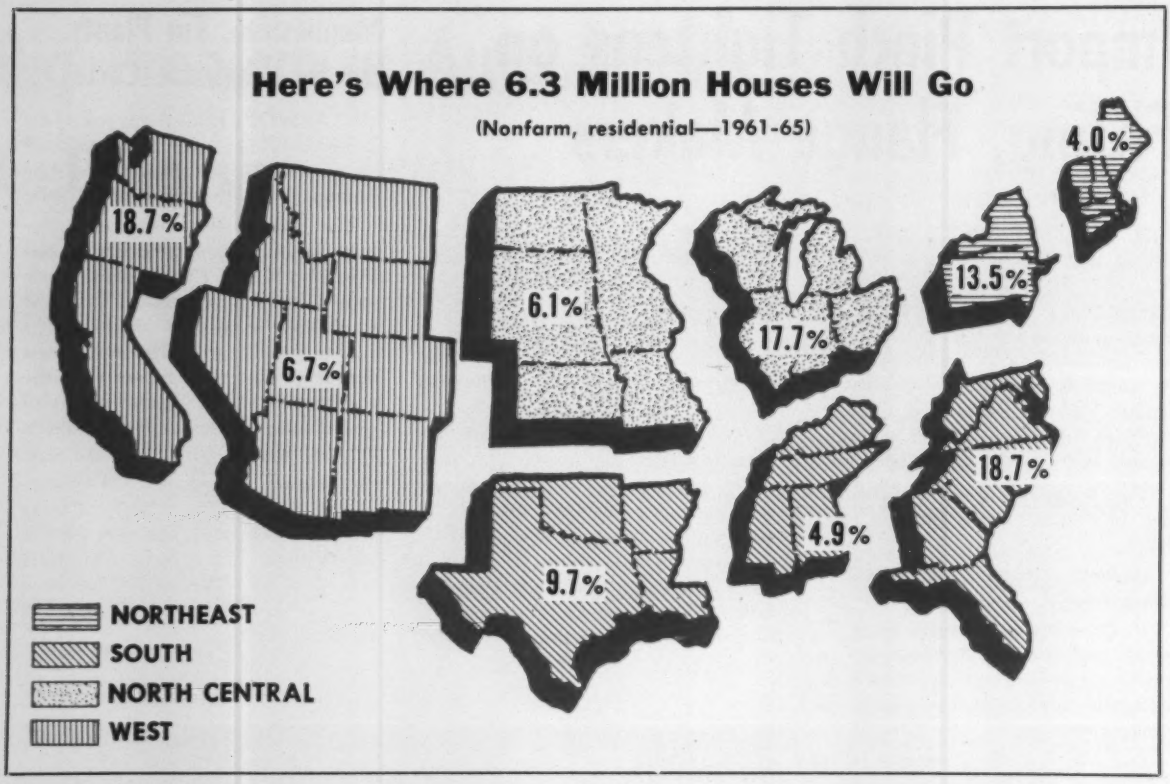
The bulk of the nation's magnesium production is in storm lashed Freeport, Tex. (The facilities are owned by Dow Chemical Co.) At presstime, company officials couldn't make an estimate of plant damage. But they report that the company has an adequate supply of magnesium stocks at its Madison, Ill., fabricating plant to take care of demand during the emergency.

At Texas City, Wah Chang Corp.'s tin smelter, the only one in the Western Hemisphere, was under 9 ft of water. The facility has been turning out about 2000 tons of metal a month.



Device Detects 0.0003 in. Deviation

AN OPTICAL SYSTEM built by Barnes Engineering Co., Stamford, Conn., can determine the straightness of a 0.30 caliber rifle barrel within 0.0003 in. It consists of a light source, lenses, a beam splitter, and prisms. When a light beam completes its route and strikes a lead-sulfide detector, it causes rotation of a servodriven restoring plate whose output is converted into information on the amount and location of any deviation.



Source: Denton Housing Trends.

Analyst Predicts Slight Housing Dip

LOOK FOR a total of 6.3 million nonfarm, residential houses to be started in the U. S. from 1961 through 1965—4 per cent lower than in the previous five years.

The prediction comes from David B. Denton, analyst, Denton Housing Trends, Coral Gables, Fla. Only the Western region, he says, will exceed its 1956-60 total housing starts.

• **The Cause**—"The five years of 1961-65 come at the end of the pent-up demand period which followed World War II and occur just before a period of increasing demand for housing in the mid and late 1960s," says Mr. Denton.

What will follow the slump? Mr. Denton says: "The effects of comparatively lean years on building codes, costs, and techniques may be fully realized during the last half of this decade. The building industry should be prepared to satisfy the increase in housing demand with a housing value historically unrivaled."

• **Top Ten States**—When ranked by estimated volume, the leading homebuilding states show no change for the next five years vs. the last five. California occupies the No. 1 spot, followed by Florida, New York, Texas, Illinois, Ohio, Michigan, Pennsylvania, New Jersey, Virginia. A different tale is told when the states are listed according to estimated percentage increase. Colorado leads, followed by New Mexico, Delaware, Washington, Idaho, Oklahoma, Virginia, Georgia, North Carolina, Utah.

Region by Region

Here's how the analyst rates the homebuilding outlook in the major regions of the country—he includes public and private homes and apartment units, but excludes group quarters, farm homes, transient accommodations, mobile homes, and houseboats.

• **West**: 1.6 million housing starts. The population surge in many Western states has been rapid since World War II. California, Colorado, Arizona, New Mexico, and Nevada have bounded upward. Utah and Washington have also contributed to the high regional growth rate.

Look for these trends: Single family housing will take up a larger share of the total housing construction market; multifamily housing construction will slacken, particularly in California. Mobile, prefab, and shell homes will continue to make inroads in the market—emphasis will be on second homes and vacation cottages.

• **South:** 2.1 million housing starts. This region should build 2 per cent fewer housing units (50,000), in the 1961-65 period vs. the previous five. Florida will remain an important homebuilding state, second only to California in volume.

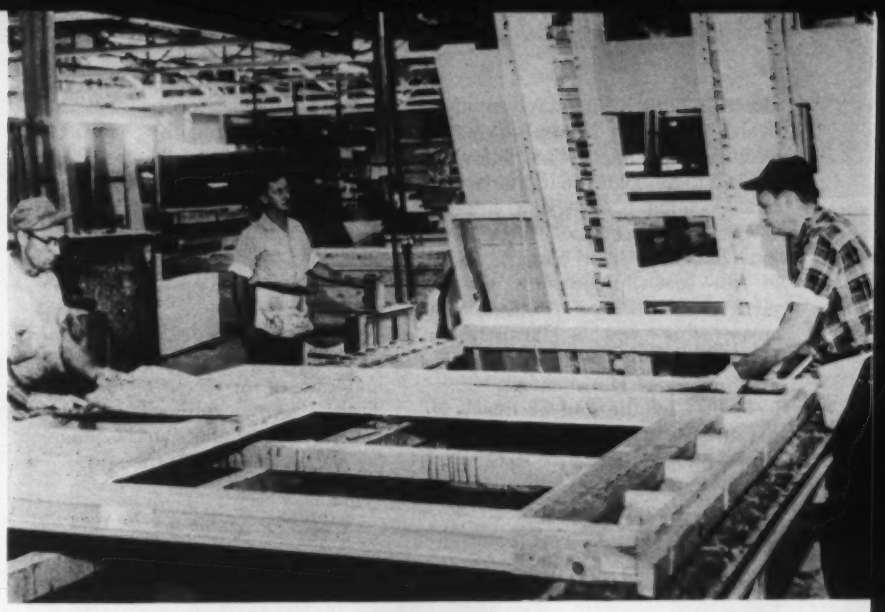
Single family housing construction will come close to but not equal the 1956-60 total; multifamily housing construction will dip; mobile, prefab, and shell homes will gain strength, as in the West. Segregation issue will depress new housing demand in the South because it influences location or relocation decisions of industry; the South's share of total housing starts will be 33.3 per cent, up 0.4 per cent over the previous five years.

• **Northeast:** 1.1 million housing starts. Look for 6 per cent fewer housing units to be built here than in the last five years. No state is expected to better its 1956-60 total of housing starts.

Unemployment will have an adverse effect upon housing demand; single family housing will remain on a par with the previous five year level. Multifamily housing construction will slow. The Middle Atlantic subregion, where most of the multifamily housing is built, will bear the brunt of the regional percentage decline; the Northeast's share of the total housing starts will drop 0.5 per cent, from 18 per cent to 17.5 per cent, during the next five years.

• **North Central:** 1.5 million housing starts. The housing construction outlook for 1961-65 is dimmest in this region. The predicted 9 per cent decline from the 1956-60 total of 1.65 million starts is a reflection of adverse demographic and economic trends. Here, as in the Northeast, no state is predicted to surpass its volume of housing activity of the last five years.

Structural unemployment will hurt the region generally. Continued migration will create a surplus of used homes that will be only partially filled by newcomers. Single family housing construction will drop; multifamily housing will move downward, reversing the trend of the previous five years; prefab housing will grow. The region's share of total national housing starts should drop from the 25.3 per cent of 1956-60 to about 23.8 per cent.



Home manufacturers gear up for bigger market

Packaged Home Sales Climb

HOME MANUFACTURERS are planting a bigger foot in the door of the homebuilding field.

This year, an estimated 140,000 manufactured homes will be shipped from factory docks, about 10 per cent more than in 1960, says the Home Manufacturers Association (HMA), Washington. One industry leader predicts the industry will see a 12 per cent gain in unit sales in 1962 vs. 1961. Some executives feel that within 10 to 15 years, 50 per cent of all homes built will be fabricated in factories.

• **Number of Starts**—In 1946, manufactured homes comprised 6.31 per cent of all single family housing starts vs. 13.13 per cent last year. Here's how the HMA records the market's growth:

Year	Packaged Home Shipments	Housing Starts†	Percentage of Market
1957	93,546	872,700	11.00
1958	110,080	977,300	11.26
1959	132,054	1,100,000	12.00
1960	126,867	965,600	13.13
1961*	140,000		

*Estimated.
†Single Family.

• **Number of Builders**—The industry's growth is evidenced another way: 300 companies are producing packaged homes in the U. S. and Canada. They sell to an estimated 10,000 builder-dealers, says the HMA.

National Homes Corp., Lafayette, Ind., lists nearly 1700 dealer-builders for itself and its subsidiary companies. Inland Homes Corp., Piqua, Ohio, provides 26 services in planning, marketing, financing, and construction for its dealers.

• **Style and Price** — "More home buyers and builders are beginning to realize that high quality manufactured homes are available in a wide number of designs at lower costs," declares Jerome J. Madigan, HMA executive vice president.

Manufacturers have also beautified their products. It is impossible for most home buyers to distinguish between factory built and on-site built homes. Almost any architectural style is available. Prices vary widely too—from $7000 to $170,000—with the greatest sales volume in the $8000 to $25,000 range.

• **1961 Sales** — Respondents to a STEEL survey are unanimously enthusiastic about 1961 sales. Inland

Homes reports a Pittsburgh builder-dealer sold 116 homes during a weekend opening. The following weekend, he sold 166 units in another location.

Admiral Homes Inc., West Newton, Pa., says it is already ahead of last year's production and expects a 15 to 20 per cent sales increase this year. Harnischfeger Homes Inc., Port Washington, Wis., a subsidiary of Harnischfeger Corp., feels that by the end of this year, its sales volume will almost have tripled since 1956.

Pease Woodwork Co., Hamilton, Ohio, reports a significant change in the marketing of homes during the last five years. The company sells the greatest portion of its homes to project builders.

• **Use of Metals** — Producers of manufactured homes, unhampered by traditional building concepts, are continuously seeking new, lower cost materials to produce a better house. They're turning to metals and other materials—and the market promise for metalworking is immense.

The STEEL survey shows that use of metals and metal components varies all over the lot. Knox Homes Corp., Thomson, Ga., reports using aluminum siding on about 70 per cent of all the homes it sells, but another builder comments that metal siding was dropped because of low demand.

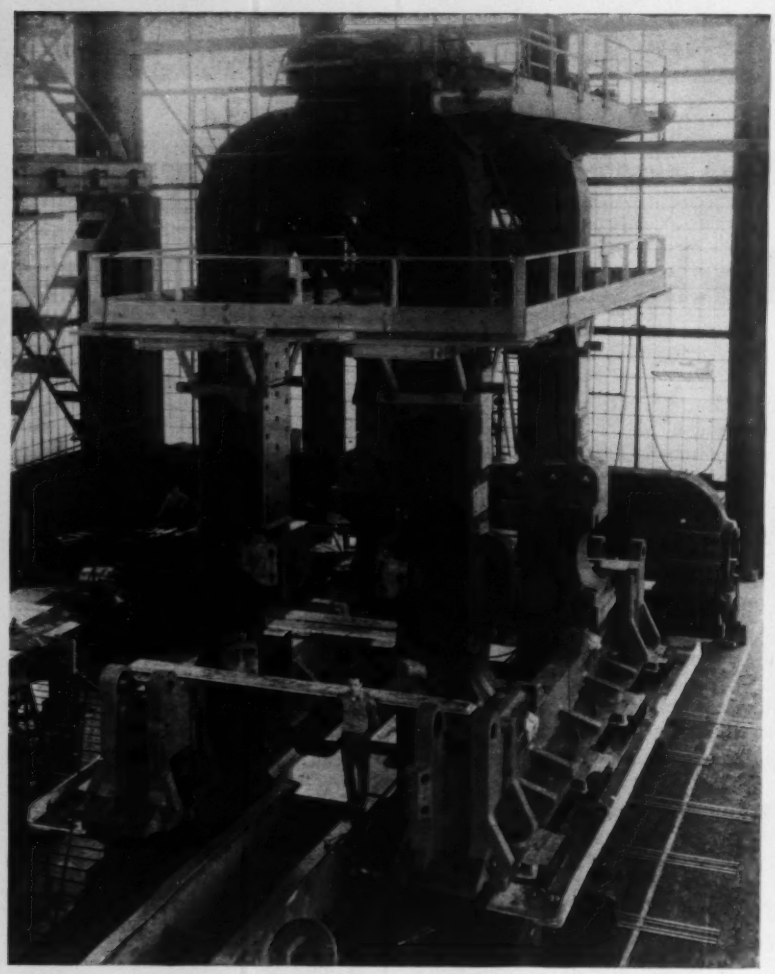
About ¾ ton of steel is used in the homes of U. S. Steel Homes, New Albany, Ind., a division of U. S. Steel Corp. In its 1962 product line, the division will use adhesive to fasten interior gypsum board panels to steel stud framing. The innovation allows a substantial reduction in field finishing costs and permits an 18 per cent reduction in the amount of nails used per home.

National Homes features aluminum siding and soffits on all of its homes. It and U. S. Steel Homes assert they use metal when it proves to be the best material from the standpoint of performance, cost, and customer acceptance.

• **Packages for Packages** — Many manufacturers supply complete wiring and plumbing packages with their package homes. National Homes, through volume buying, provides copper plumbing and piping at a cost equal to that of cast iron and galvanized pipe purchased at the construction site.

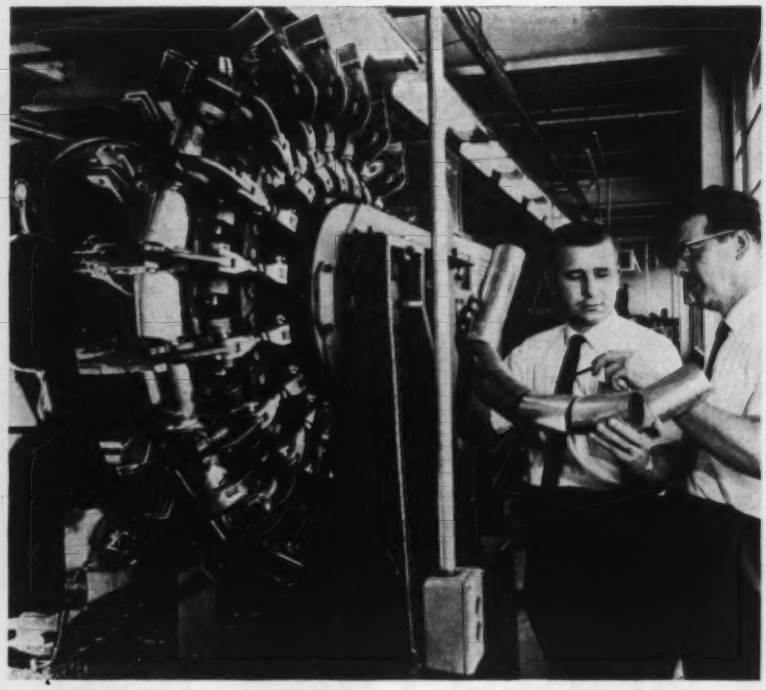
Most producers provide options on built-in appliances, like ovens, ranges, and dishwashers. Some use metal kitchen cabinets exclusively, and most offer a choice of metal or wood. National Homes, in co-operation with Stewart-Warner Corp., Chicago, developed a dual duct heating system to provide better heat balance in split-foyer homes. Saving: As much as $250 per installation.

Aside from the metal that goes into production equipment used by the factory builders, a myriad of metal components goes into the manufactured homes. Among them: Hardware, fittings, nails, gutters, downspouts, shutters, siding, plumbing, wiring, furnaces, ducts, aluminum chimneys, flue stacks, bridging for floor decks, metal window screens, sliding and folding doors, door trim, windows, screens, soffits, steel shelving, cabinets, shower stalls, structurals, grip plates on roof trusses, and roof flashing.



Huge Castings Readied for French Mill

STEEL PLATES in maximum widths of 124 and 164 in. will be rolled on a mill being installed at the Dunkirk plant of USINOR, a French steel company. Housings for the adjustable width mill—each weighing 214 tons—were cast at the Vandergrift (Pa.) plant of United Engineering & Foundry Co., then finished and assembled at United's Youngstown facility.



By slicing welded tubes to length, this . . .

Radical Machine Spews 2000 Cans a Minute

"IF YOU could forget all you know about present canmaking machinery and start from scratch, what kind of a new machine could you come up with?"

That challenge was tossed to William C. Stolk's research team four years ago. He was then president, now chairman, American Can Co., New York.

The team's answer is a machine that will turn out cans at speeds up to 2000 a minute. Maximum speeds on current canmaking machines are about 600 a minute, the company says.

• **New Approach**—Normally, cans are made from blanks of tin plate cut to the size of a single can body. The blanks are fed automatically into a machine that notches, forms, solders, and presses them.

The new machine makes cans from a continuous ribbon of sheet, forming it into a tube, welding the sides, and automatically cutting the tube into cans of proper size on a giant "Ferris wheel" at the end of the operation.

• **Versatile**—Three years ago, when the plans for the new machine were first submitted, it was decided that the new theory of canmaking was economically unfeasible, in view of the investment in machinery and the material (primarily, standard tin plate) used then.

"Since that time," says William F. May, vice president and general manager of the Canco Div., "there has been an evolution in the materials used in canmaking. Over the last three years, aluminum has found increasing acceptance as a material for cans; the steel industry's answer to aluminum is double-reduced tin plate. What was needed was a revolution in canmaking machines — machines versatile enough to handle both aluminum and tin plate in volume quantities. We now have such a machine."

The machine will make cans from aluminum, standard tin plate, thin tin plate, and "tinless" steel plate coils. The first new machine will begin producing cans commercially "early in 1962."

GE Project Progresses

The first of a series of new rolling mills for processing 24 in. wide, refractory metal sheets is being installed in General Electric Co.'s Euclid, Ohio, plant (STEEL, Jan. 30, p. 93).

R. F. Johnson, general manager of GE's Lamp Metals & Components Dept., says that production of wide tungsten sheets is expected to start in October.

Gordon Rattray, manager of the project, says that many of the sheets will be shipped in 25 ft lengths (a shipping limitation rather than one of equipment). The series of mills planned for the plant will also be used for refractory metals, such as molybdenum, columbium, and tantalum.

The mill was designed and built by Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. The entire project will represent an investment of $15 million.

Production of Commercial Items to Halt at Bristol

Kaiser Metal Products Co., a subsidiary of Kaiser Fleetwings Inc., New York, will phase out production of its line of sinks, bathtubs, and kitchen cabinets at the Bristol, Pa., plant by yearend.

Kaiser Fleetwings plans to step up its defense business. The firm is involved in the production of rocket motor, aircraft, and space hardware components. The decision to discontinue its commercial products is due to decreased demand and depressed price levels, says H. L. McKee, vice president and manager of Metal Products.

Senators Dirksen, Goldwater, Javits, Saltonstall, and others lead the . . .

Counterattack on Steel Price 'Freeze'

"I DO NOT believe we can produce a healthy domestic economy by government interference with the delicate balances of a free enterprise system." So said Sen. Leverett Saltonstall (R., Mass.) as Republicans and conservatives countered the recent attack on steel pricing policies (STEEL, Aug. 28 p. 40).

Highlights of the afternoon's debate on Sept. 7:

Sen. Everett M. Dirksen (R., Ill.): "This appears . . . to be the first attempt at psychological price control by using threats . . ."

Sen. Jacob Javits (R., N. Y.): "I saw in the recent Democratic campaign . . . a tendency to make a whipping boy of steel company management without adequate recognition of the roles of labor and government in the economic situation . . ."

Sen. Barry Goldwater (R., Ariz.): "Unearned wage increases which result in unearned price increases are really the source of our problem . . ."

Sen. Prescott Bush (R., Conn.): "The industry has not been able to acquire the necessary depreciation reserves to meet the problems of natural growth . . . so the industry has had to create earnings which would sustain large debt. It has had to go to the market place to borrow hundreds of millions of dollars to finance an expansion which had to take place in the interest of the country."

Sen. Strom Thurmond (D., S. C.): ". . . the more government is injected into the process and the more we try to threaten industry . . . the more we shall get into trouble."

Sen. Hugh Scott (R., Pa.): ". . . the Oct. 1 increase will cost about $145 million a year from now on."

Sen. Thomas H. Kuchel (R., Calif.): ". . . the responsibility for inflation and the problems of the steel industry are not as simple as was suggested . . ."

Sen. Roman L. Hruska (R., Nebr.): ". . . the calculation of profits based on net worth is meaningless. It is misleading."

Sen. Kenneth Keating (R., N. Y.): "I wish some of the members who have taken such a vital and personal interest in steel prices would take an equal interest in the over-all condition of our federal budget."

Sen. Jack Miller (R., Iowa): "Business is literally crying out to expand, but they do not have the incentive to expand."

● **Profit Sharing Suggested**—Senator Javits raised some eyebrows on his side of the aisle when he suggested profit sharing in the steel industry as an approach to the price problem. He recommended:

1. That labor agree today to withhold wage demands at the steel bargaining sessions next year if prices aren't increased now. In the bargain, labor would agree to switch its demand to some form of profit sharing and stock ownership, plus a "suitable" cost of living increase.

2. That the steel industry, in return, would promise not to raise prices and to "be receptive" to profit sharing and stock ownership.

3. That labor and management would jointly endorse a "peace production board" (PPB) which would have the authority "to make recommendations to the President regarding legislation on price, wage, commodity, and material controls and allocations." The PPB would further encourage labor - management-public committees to increase productivity, reduce labor-management tensions and absenteeism, and smooth the transition to greater automation.

CINCINNATI

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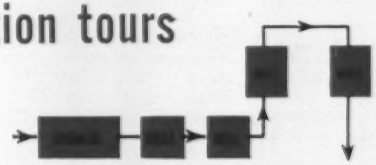
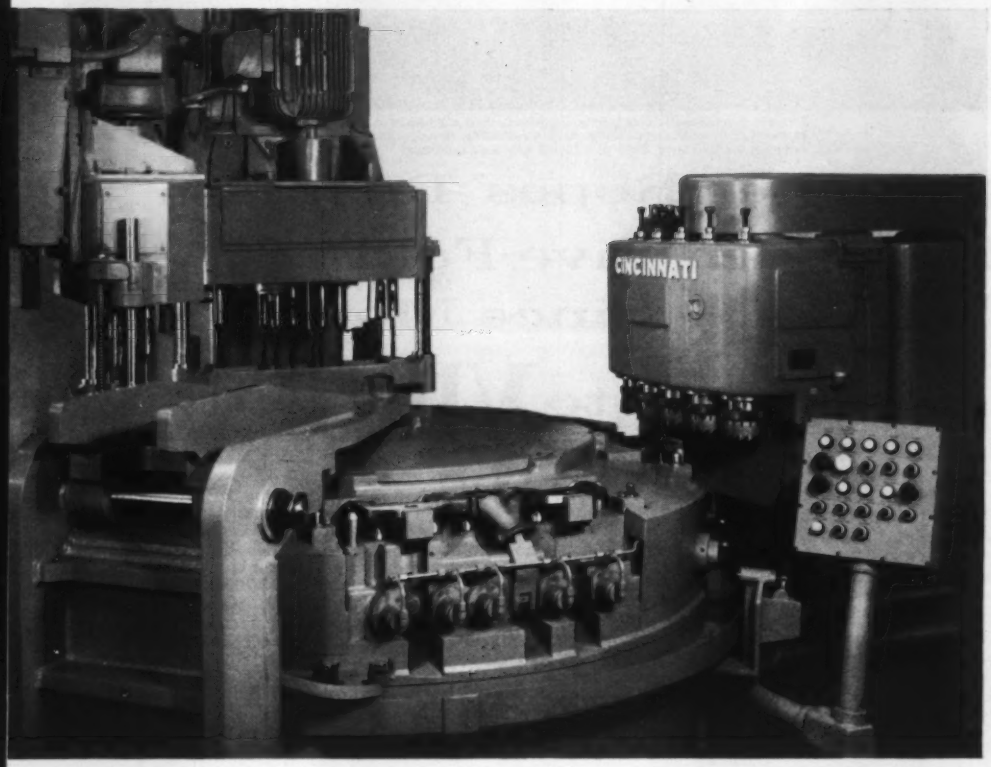
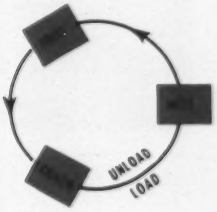
plans and develops low-cost production tours

Straight Line

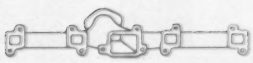


Straight Line and U-Turn





Rotary Index



Milling, drilling and broaching of exhaust manifolds is completed on this CINCINNATI Rotary Index Machine at a production rate of 105 parts per 48 minute hour. Broaching is free, performed during the rapid index segment of the cycle.

PRODUCTION "TOURS" planned and developed by Cincinnati give you a fresh outlook on how low production costs can really be. The work may progress from one operation to the next in a straight line, U-turn or circle.

One giant 36-Station Transfer Line built by Cincinnati automatically machines V-6 and V-12 cylinder blocks. The blocks move through the world's largest broaching machine, then follow a straight line through drilling and milling stations, finally taking a space-saving U-turn through two more milling stations. In another Cincinnati production line, aluminum transmission cases follow a straight path while receiving 33 machining operations. Some types of parts are particularly adapted to a circular production tour. Cincinnati's Special Machine Division has built many machines of this type, some for milling, others for milling and drilling, while still others include a free broaching operation. One example is illustrated above.

Whatever your metalworking requirements, you can be sure that Cincinnati's 47 years' experience in building automatic machines and production lines will result in the lowest production cost and the highest degree of dependability. May we help you? **Special Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

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SPECIAL MACHINE DIVISION

DESIGNERS AND BUILDERS OF
SPECIAL MACHINES • HORIZONTAL BROACHING MACHINES • COMPLETE PRODUCTION LINES

Unique Rochester Ropes plant, on 20-acre site at Culpeper, Va. Equipment like 25-ton traveling crane, 120-foot-long stranding machine and big closing machine are housed in building of gracious colonial architecture amid plantation-like surroundings.

Rochester Ropes' Business Has Expanded Five-Fold Since Moving to VIRGINIA

Rochester wire rope and other products go all over the world for use in industries of many sorts. Wire rope ranges from $\frac{1}{4}$" steel thread to 3" hawsers. A complete laboratory maintains quality control.

EMPLOYEES are largely Virginians with farm backgrounds, a factor contributing to initiative and versatility. Many have spare-time farms. Plant's 3 top engineers are graduates of Virginia Polytechnic Institute.

When Rochester Ropes, Inc. — a leading manufacturer of wire rope — sought a new location, many states were considered. Final choice was Culpeper, Virginia. In a way, this was a homecoming, since the Rochester family, still at the company's helm, were Virginians who commenced manufacturing rope in the late 1700's. Reasons for choice: excellent rail and highway transportation, pleasant living for management, wholehearted community cooperation and, above all, the intelligence, integrity and skill of local manpower. Today, with 200 employees, turnover is virtually nil, safety records excellent. Workers have demonstrated versatility by even helping to build many of the plant structures. Success of the move to Virginia is proven by the fact that business has expanded five-fold.

Find out more about the production advantages of Virginia. In confidence, phone, wire, or write . . .

C. M. Nicholson, Jr., Commissioner
Division of Industrial Development and Planning
VIRGINIA DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
Room 803-ST, State Office Bldg., Richmond, Va.
Phone MIlton 4-4111, Ext. 2255

Send for free case history brochure "Facts Favor Virginia for Your New Plant Location"

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Who's Going Where in Europe

	Belg.-Lux.	France	W. Ger.	Italy	Holland	Total C.M.[1]	U.K.	Switz.	Other EFTA[2]	Total EFTA	Other Europe	Total Europe
Machinery, Nonelec.	20	41	29	26	17	133	42	26	6	74		207
Elec. Mach. & Electronics	9	12	9	22	6	58	11	8	4	23		81
Appliances	—	8	6	5	3	22	8	4	1	13	1	36
Transportation Equipment	10	19	6	13	3	51	7	7	1	15		66
Office Machinery	4	4	7	2	5	22	5	7	3	15	2	39
Instruments	2	10	14	8	10	44	7	7	—	14		58
Metals & Products	15	15	9	9	3	51	7	4	1	12	2	65
Research & Engineering	2	7	5	1	5	20	4	4	—	8		28
Petroleum	4	8	4	10	3	29	1	2	1	4	2	35
Chemicals & Drugs	35	14	25	33	27	134	15	14	6	35	6	175
Paper	4	7	4	3	—	18	5	3	1	9	2	29
Textiles & Clothing	6	3	4	4	5	22	6	4	1	11		33
Food, Beverages & Tobacco	4	8	13	5	7	37	10	7	1	18	2	57
Services	4	9	8	6	3	30	3	6	3	12	2	44
Other	9	12	11	8	6	46	6	1	2	9	1	56
TOTALS	128	177	154	155	103	717	137	104	31	272	20	1,009

1. C.M.—Common Market (European Economic Community).
2. EFTA—European Free Trade Association (Outer Seven).

This listing of 1009 new business ventures by U. S. firms in Western Europe between January, 1958, and June, 1961, was compiled by the Chase Manhattan Bank, New York. Production operations predominate, but headquarters and sales companies account for a growing share of the total—2 per cent in 1958-59, 18 per cent in 1961. More than half the production operations were established in co-operation with European companies.

African-U. S. Group Formed

THE African American Trade & Development Association has been formed with four major purposes: 1. Research and fact finding on trade and investment opportunities in Africa. 2. To provide a point of contact between African and U. S. businessmen. 3. To conduct seminars and other meetings on African industry and development. 4. To advise U. S. government officials on the thinking of member firms on problems and issues affecting business relations with Africa.

Chairman of the new group is Eric Johnston, president, Motion Picture Association of America. Other board members include Fred S. Haggerson of Mettalurg Inc., Fred Shanklin of Union Carbide Ore Co., W. F. Leonard of Olin, Jack M. Schippers of Texaco Inc., T. B. Coughran of Bank of America, F. Taylor Ostrander of American Metal Climax Inc., and George Streepy of Aluminum Co. of America.

Around the World

ENGLAND—New orders for steel slowed in August, partly due to high inventories. July steel output in Britain, affected by holidays, fell to a weekly average of 380,000 tons—vs. 447,000 tons in June . . . Only 175,306 new cars were exported during the first six months vs. 342,415 during 1960's first half.

NORWAY—The Chr. Michelsen Institute, Bergen, has received a grant of $100,000 from the Rockefeller Foundation to study relations between have and have-not nations, especially how the developing countries affect world trade.

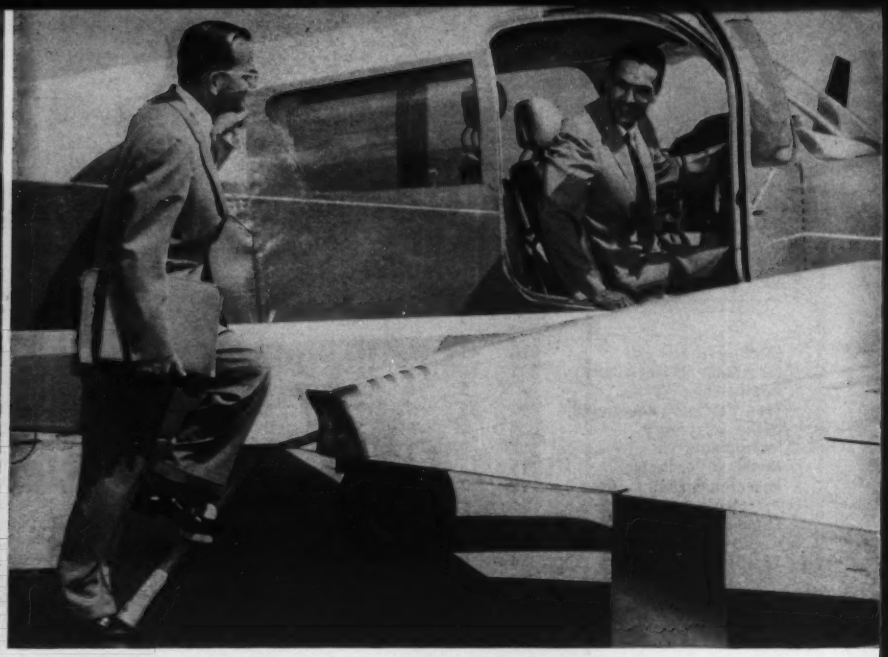
COLOMBIA—The International Finance Corp. has invested $500,000 in Electromanufacturas S.A., (EMSA) Bogota, to help finance an expansion of electrical equipment production facilities. Since 1958, EMSA has been producing welding electrodes under license from Westinghouse Electric International Co. The firm will now produce fuse cutouts, capacitors, lightning arresters, and welding equipment.

GERMANY—Dillinger Steelworks has started operating a vertical type, continuous casting plant to produce steel slabs up to 60 in. by 8 in. Schloemann A.G., Dusseldorf, and Concast A.G., Zurich, built the plant.

INDIA—Harig Mfg. Corp., Chicago, has entered into a joint venture with an Indian businessman to establish a tool and die shop in New Delhi.

SWEDEN—The Swedish government has decided not to follow the lead of Britain and Denmark in seeking membership in the European Common Market, Premier Tage Erlander told a union congress. He said the Rome Treaty could not be reconciled with the Swedish policy of neutrality.

AUSTRALIA—The federal and West Australian governments have decided to spend $92 million on railways to help establish a steel plant in West Australia. Broken Hill Pty. Ltd. has agreed to establish a $99 million steel plant at Kwinana when the railway is completed. Target date: 1968. Broken Hill is also planning a $95 million plant at Whyalla, South Australia. The firm is Australia's biggest industrial enterprise and the largest, single integrated steel company in the commonwealth. It is pushing into overseas markets. Example: It has sent sales teams to North America and Southeast Asia.



NEVIN H. DECKER JACK SPRINGER SAM COLE GENE SCHLETT

At Industrial Nut, decisions are made in minutes, customers served in hours . . .

Flexibility:

Key to Small Firm's Prosperity

IN MODERN business, Industrial Nut Corp., Sandusky, Ohio, stands practically as an anomaly. It thrives on reductions.

It selectively pared its customer list from 1000 to 100 names.

It reduced employment from 250 to 120.

It cut its sales force from nine manufacturers' representatives to two.

Result: Its dollar volume of sales has tripled in 20 years.

There are other reasons for the special nutmaker's prosperity. "Service comes first with us," says Jack Springer, president. "To assure top service, we require flexibility in all our operations. Our smallness enables us to make major decisions within 5 minutes and serve customers within hours."

The firm produces 5000 different special nuts for blue-chip companies in transmission, axle, engine, truck, and elevator fields, and makers of farm and road building equipment.

• **Marketing Approach** — In the early days of the 53 year old company, employees forged nut blanks out of steel rail webs, using homemade equipment. Product lines grew, with emphasis on standard and special fasteners. "After World War II, our list of 1000 buyers became unwieldy, and we had too little control over our nine sales agents," says Sam Cole, sales manager. Today, 80 per cent of the company's customers are within 500 miles of the Northern Ohio plant. Nevin H. Decker, vice president explains: "We picked special fasteners for our product line, then chose the area and customers we wanted to serve."

And serve it does. Industrial Nut is flying its sixth aircraft, a Cessna 310, which it shares with a trucking company. "We call on customers about two or three times a year," says Mr. Cole, "rather than the almost routine calls made weekly or monthly in bygone years. We literally descend on customers." A team of Industrial Nut representatives, consisting of the president, sales manager, a process engineer, and maybe a foreman, will fly to a customer's city and settle specifications, price, delivery, quality, and other sales questions within hours. In one case, a customer called in an emergency order. It cost $150 to have the order flown to the buyer. He was billed only $10. Pilot Gene Schlett logs around 400 hours (about 80,000 miles) each year in flying Industrial Nut's executives on sales calls and in making deliveries.

• **Programed Purchasing** — Among other services, the family owned firm offers to program nut require-

ments of its customers. It works this way: A price is quoted on annual usage of any given part, and the buyer issues one order per year. Industrial Nut maintains a finished fastener inventory and releases shipments according to request. The customer picks up several benefits: A more constant cost picture, less order writing, obligations for a current buying agreement but not for any engineering changes.

Mr. Cole recently checked product blueprints for a large division of an international company and saved the firm $50,000. The programing nailed down a $300,000 order that represents 95 per cent of the buyer's annual fastener needs. "Guaranteed delivery and inventory helped," says Mr. Cole, "but we also show customers how to re-engineer and design nuts for cost savings."

Back of that approach is employee ingenuity and versatility, plus highly adaptable equipment. Mr. Springer comments: "We need experts in sales, accounting, production, distribution, and all other elements of business. Most companies hire those talents. We manage to acquire, purchase, or develop them by getting assistance from employees, customers, and suppliers." One supplier gave assistance in inspection procedures . . . another came up with accounting information . . . a machinery firm lent a hand with cold forming techniques . . . steel companies provided metallurgical knowhow.

"Close work with suppliers has really paid off," notes Mr. Cole. "We pioneered shipping nuts in corrugated containers and even have our customers' names printed on boxes, so they can be re-used for shipments to their dealers. Not long ago, our shipping clerk developed a new box design with the aid of a supplier. It will hold the equivalent of ten normal sized boxes, and its contents can be unloaded into storage bins by one man using a fork lift truck."

• **Do It Yourself**—The company pursues the policy: "We're going to do it somehow—let's get at it!" Employee response to that challenge is tremendous. "We found our folks were more interested in a steady pay check than fancy titles," observes Mr. Springer. "In 20 years, they have never worked less than 40 hours a week and have never been laid off for lack of work. We built our heat treating and plating rooms, installed machinery, and constructed our building with our own people. During the recent recession, we had women wielding saws and hammers, renovating our recreation room at their regular rate of pay."

Mr. Decker adds: "We installed incentive pay and a company funded profit sharing plan. Employees get three weeks of vacation after five years of service, two weeks before five years. Employees do not line up before time clocks, but job clocks are used for cost accounting. We don't post shop rules; they were irritants instead of reminders. Employees smoke when they want to in safe areas and take coffee breaks when they have the time. Our seventh paid holiday falls on November election day to encourage voting. We recognize our people are individuals, not units like machine tools."

The company purchased three outboard motor boats for employee use.

Sandusky is on the shores of Lake Erie and interest in water activities runs high.

"We haven't disputed a workmen's compensation claim in 17 years," says Mr. Decker. "Some personnel people feel they can justify their jobs by contesting claims —we trust our people; they trust us; so we simply decide the facts as we see them and make our reports."

• **The Payoff**—Out of those benefits has come a degree of employee loyalty that almost any company would like to have. There's no turnover in employment and less than 1 per cent absenteeism.

As with most small companies, Industrial Nut has to finance its growth out of retained earnings, or simply work smarter than its competitors to increase capacity and sales. It makes all its special tools, punches, dies, and taps. All screw machines are redesigned and rebuilt for more production at lower cost.

• **Cost Savers**—One customer was paying for stronger nuts than he needed because the desirable size was available only in one high grade of steel. Industrial Nut solved the problem by switching from hot forged stock to hexagonal tubing. Mr. Cole cites the benefits: "When we used hot forged stock, the dies cost $800 to $1000; the hole had to be machined; and 50 per cent of the stock went into the scrap heap. With tubing, there's no die cost; the hole is in the tubing; there's better machinability and negligible scrap; and all operations are automatic. Solid bar stock (to make 1000 pieces) weighed 8355 lb; hex tubing weighs 5442 lb. Costs were reduced from $4.74 to $3.40 per piece."

In another cost cutter, Industrial Nut developed a series of stake nuts to replace bearing retaining nuts used with tab washers. The firm's designers came up with a nut that eliminates the tab washer and saves 30 per cent over the old method. The new nut is positioned on the shaft, and a portion of the collar is staked into a keyway. For reuse, the staked section is moved back to clear the keyway. Tests have shown that the nuts can be used many times.

• **Prize Winner**—Mr. Cole collected a $1000 award in STEEL's December, 1960, Usership Idea of the Month contest with this idea: Industrial Nut produced $50,000 worth of snap rings per year for a major account. Formerly, the rings were produced from round tubing. Now, the fastener maker purchases extruded sections to the correct size and cuts off lengths on a shearing machine. The lengths are bent into round shapes on a special machine, heat treated, then reset to correct diameter and tension. The technique eliminates machining two inside diameters and slotting one side. Customer saving: A little more than 20 per cent.

"All this adds up to customer service," concludes Mr. Springer. "Not long ago, we witnessed severe price fighting in standard lines of fasteners and felt the squeeze applied by foreign producers. Rather than chisel on prices, we dropped our standard lines—even though they were volume salesmakers. We made up our mind that we wanted to make a lot of nuts, make a profit doing it, and have fun doing a good job. Price fighting might have helped us with the first objective but not the last two."

A Swedish executive's views on . . .

Principles of Foreign Expansion

PROFITS AND POLITICS—historic motivations that lead a company into foreign operations—are no longer the only forces in the picture, says Sven T. Aberg, president, L. M. Ericsson Telephone Co., Sweden.

He spoke last week at the International Industrial Conference sponsored by the National Industrial Conference Board and Stanford Research Institute.

The Swedish executive comments on the motivations to expand into foreign operations. He cites the risks and responsibilities of the multinational company based on observations of his firm, a producer of capital goods for the telecommunications field which has operated in many foreign countries 64 years.

• **Motivations** — Prime motivation for expansion overseas, says Mr. Aberg, are "the dynamic forces inherent in all progressive companies . . . logically directed toward growth and expansion." The desire or need to diversify may also contribute to the decision to expand abroad since it is sometimes more advantageous to diversify geographically rather than productwise.

He feels that the multinational company must not overlook its obligation to shareholders but it must also recognize the motivations of the citizens of countries in which it is operating.

• **Risks**—The most crucial decisions are those pertaining to investment. Against the possibility of profitable expansion must be weighed risks such as nonconvertibility of currencies, freezing of dividends and royalty payments, possible expropriation without adequate compensation, the hazard of losses from revolutions or wars.

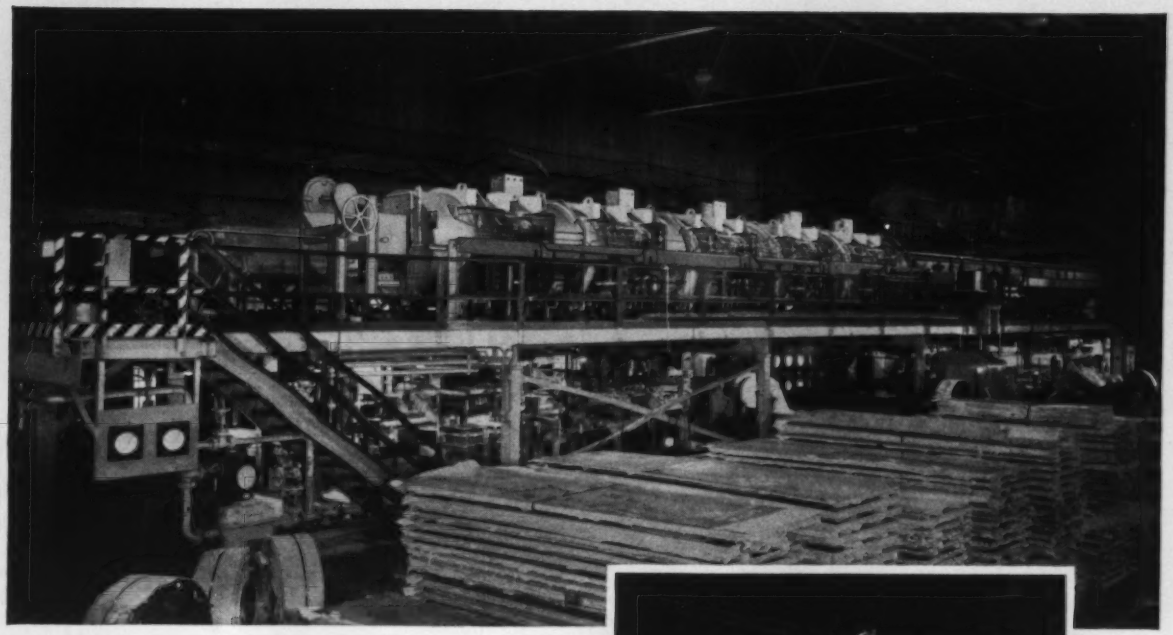
• **Beware of Inducements** — Mr. Aberg points out the numerous laws enacted during the postwar period to attract foreign investment through tax relief, reduced tariffs on equipment imports, and guarantees. He recalls how his company has learned that economic climate, particularly in developing countries, can change quickly. "It is a mistake," he believes, "to base programs of foreign expansion on so-called inducements or concessions. The only sound basis for such programs must be the existence of an established market or the conviction that a market can be established with long range prospects for competitively priced merchandise."

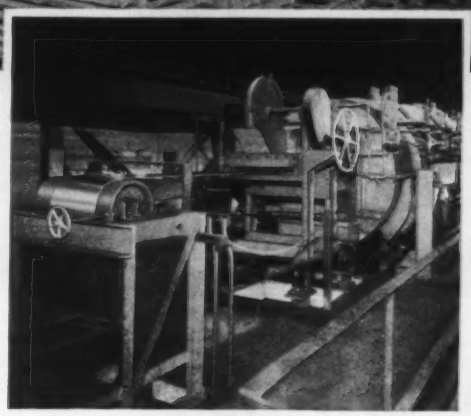
• **Responsibilities**—When a company is operating in a foreign country, is must assume a multinational responsibility, says Mr. Aberg.

He is of the opinion that it must be concerned with the economy of its home country and the countries in which it operates. He also stresses the importance of being responsible for product quality, dependable service, and ethical dealings—factors which account for the progress made by outstanding multinational companies.

His Tips on How to Act Overseas

- **We try to provide opportunities for local investment participation, wherever practicable.**
- **We believe in giving nationals of a host country a share in policymaking within our subsidiaries, commensurate with their responsibilities and investment.**
- **We try to offer qualified local nationals employment opportunities at all operating levels. We want to train local people to be more productive laborers, technicians, engineers, and managers.**
- **We insist that our own people give more than lip service to local customs and cultures. We want them to learn not only the language but the history and aspirations of the host country.**
- **We believe in strengthening a local economy by demonstrating our ability to provide services, technical resources, or goods not previously available in the area.**
- **We do not try to do too much too soon. We recognize the value of modesty, restraint, and patience in business dealings overseas.**
- **We believe that the best way to demonstrate the viability and superiority of the free enterprise system is to assume a fair share of risk in any foreign enterprise, and distribute a fair share of profits or other benefits.**
- **Finally, we believe that flexibility is a practical operating principle for a multinational company. We do not try to impose our management methods and procedures on others simply because they work for us.**





EF Furnace *Bright Annealing Stainless Strip* at Armco Steel

• The No. 18, 24" wide Stainless Strip Bright Annealing Line at Armco's Butler, Penna. Works, pictured above, is one of 25 coating, silicon and bright annealing lines, designed and built by The Electric Furnace Co., installed in various Armco plants. Like several other EF horizontal bright annealing lines, the furnace and cooling sections are mounted on a balcony. This permits the pay-off reel, coiling reel and control equipment to be installed under the furnace, saving floor space and minimizing building changes.

EF Stainless Strip Bright Annealing Furnaces produce a durable, mirror finish on trim stock and other stainless strip *without chrome depletion*. The Electric Furnace Co. has designed and built *23 stainless strip bright annealing lines;* this is more than any other manufacturer. Included are both horizontal and vertical type furnaces, fuel fired and electrically heated.

For the highest finish, the most durable corrosion resistant surface, and the most experience in bright annealing stainless strip, you too will find that "it pays to call the EF furnace engineers".

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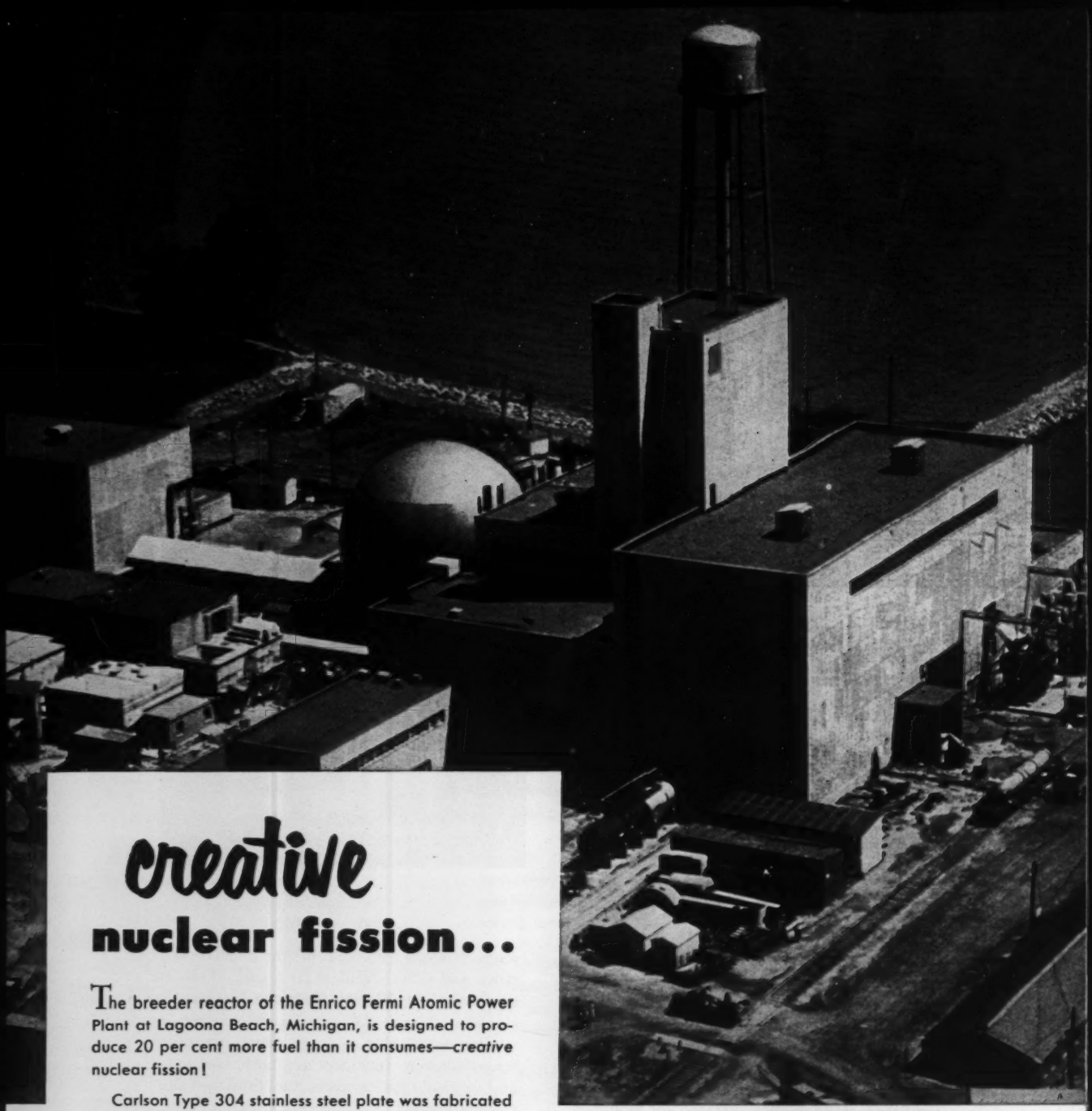
SUBSIDIARIES—Turnkey Engineering Co., Inc., South Gate, Cal. • Canefco Limited, Scarborough, Ontario
SALES REPRESENTATIVES—2842 West Grand Blvd., Detroit 2, Mich. • also 968 Coleman Rd., Cheshire, Conn.



creative nuclear fission...

The breeder reactor of the Enrico Fermi Atomic Power Plant at Lagoona Beach, Michigan, is designed to produce 20 per cent more fuel than it consumes—*creative* nuclear fission!

Carlson Type 304 stainless steel plate was fabricated into the reactor vessel by Combustion Engineering, Inc. This plate must withstand the high temperatures and severely corrosive conditions associated with nuclear service.

Carlson specialists, working exclusively with stainless steel, maintain the precise quality standards essential in meeting critical service requirements. Whether you build nuclear power plants, missiles, or corrosion-resistant process equipment, you will find at Carlson a production and on-time delivery service you can trust. We will be glad to work with you on your projects. Write, wire or phone for detailed information.

If you would like a copy of our new booklet, "Producing Stainless Steels . . . Exclusively," please let us know.

Enrico Fermi Atomic Power Plant, Lagoona Beach, Michigan. Reactor section built, owned, and will be operated by Power Reactor Development Company. Conceptual design by Atomic Power Development Associates, Inc. Detail design and construction of reactor vessel by Combustion Engineering, Inc. The turbine-generating plant is built, owned, and will be operated by The Detroit Edison Company.

PHOTO COURTESY OF POWER REACTOR DEVELOPMENT COMPANY

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Chrysler's Townsend Fights to Regain Quality Image

HOPING THAT the management storm is over, Chrysler Corp. is out to repair the damage with restyled cars and a manufacturing policy aimed at rebuilding the company's quality image.

Lynn A. Townsend, president, is paring overhead costs and attempting to strengthen the dealer structure. He admits sales and earnings have not been satisfactory since 1957, but he points to the firm's $1.4 billion assets and says: "We have the basic resources to help us do what needs doing."

It's still questionable whether Chrysler can show a profit this year. Sales through August were slightly under 500,000 units. The company apparently needs to sell about 800,000 cars to break even. If 6.5 million autos are sold next year, Chrysler should show a profit if it can slightly increase its present 11 per cent of the market.

• **Fresh Faces** — Anticipating a growing demand for what it calls "popular priced" cars, Chrysler has made a major change on Plymouth and Dodge. The entire lineup has flatter rear quarters. Hoods and decks are lower and look longer. Roof lines have been squared off and glass area reduced. New "faces" improve front end appearance. Only the Imperial continues with fins.

• **Four Body Shells** — Lancer and Valiant will be built on last year's unitized body shell. Plymouth and Dart have a fully unitized body which replaces the 1961 stub frame. The cars will be 7 in. longer than last year's and redesign has cut body weight 200 lb. The Dodge Polara will also be built on this body and presented as a luxury type personal car.

Chrysler and New Yorker lines will share the 1961 stub frame body. Imperial continues with its separate body and frame structure. Since these cars will be built on the same assembly line, the Imperial body will be dip coated for the first time.

• **Quality Changes** — Engineering changes are aimed at economy, reliability, and comfort, says Paul Ackerman, engineering vice president. Featured improvements include a redesigned automatic transmission for the V-8 engines. It's shorter, slimmer, and 60 lb lighter because a one piece, diecast, aluminum torque converter and transmission housing replaces a two piece, gray iron case. The engine is mounted farther forward. The design makes for a 2 in. reduction in the height of the floor tunnel.

The 1962 cars have no grease fittings, and chassis lubrication has been extended from 2000 to 32,000 miles, although Mr. Ackerman warns that the grease seals should be inspected oftener.

A simplified, power brake system requires no separate vacuum tank with its maze of jointed tubing. All brakes are self-adjusting. Chrysler claims a new reduction gear starting motor is an industry "first." It's half the size and 5 lb lighter than the old style starter. It has been designed for an aluminum case instead of machined steel, and it uses a plastic molded, brush holder assembly. Two pieces replace 28

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Chrysler Targets 60,000 Aluminum Engine Blocks in '62

CHRYSLER'S Kokomo, Ind., diecasting plant turned out 12,000 blocks for the six cylinder, aluminum engine this year. Next year's schedule calls for 60,000 blocks which will be used for the 225 cu in. engine that's optional on Lancers and Valiants. R. S. Bright, group vice president-auto manufacturing, says that some 170 cu in. blocks will also be cast for test purposes, but they will not be used for regular production engines. Company engineers point out that the aluminum engine has been planned as a gradual development program. They say that it's proceeding on schedule.

Although the Kokomo plant has seven, 2000 ton casting machines set up to handle block production, only three will be needed in 1962.

• **Process**—Chrysler uses SAE 303 alloy for the block material. It's purchased from Chryslum Ltd. (Canada). The metal is maintained in holding furnaces at 1350 to 1450° F. Casting temperature is 1250° F. Dies are steam heated to 600° F, and the aluminum is injected at a pressure of 12,000 psi. Rough cast blocks weigh 92.6 lb. Shipping weight is 76.7 lb, which includes the malleable iron bearing caps and 23 lb of gray iron liners. The liners are preheated to 780° F in an induction furnace before they're placed in the dies.

After the blocks are cast, they're conveyed overhead to a trim line where the bores are punched out and flashing ground off the bottom of the liners. They're then grit blasted and flow tested again. The blocks also are 100 per cent pressure tested for leaks, but impregnating the leakers is done at Chrysler's Trenton, Mich., engine plant. The reject rate for the entire casting and trimming operation is about 10 per cent, reports Harry E. Erickson, casting plant manager.

parts needed previously.

• **Materials** — Aluminum consumption has dropped from 71 to 69.5 lb on typical sedans of the Plymouth size, says Maurice Garwood, chief materials engineer. Redesign of components and trim changes have caused the reduction. With the exception of the Imperial, Chrysler is still using aluminum for its grilles. The luxury car continues with diecast zinc. The Lancer grille has been switched from stainless to aluminum. The corporation is using a black anodized finish on several grilles.

Plastics usage has increased slightly, Mr. Garwood reports. One application of particular interest to metalworking is a change from metal to plastic clips for fastening exterior body trim. The plastic clips cost more, but they give added corrosion protection. Automakers have long been plagued by rust streaks which spread from beneath the trim strips as the clips corrode. Even cadmium plating has not cured the problem, says the chief materials engineer.

Delrin will continue to be specified for Lancer instrument cluster housings, but there will be a switch back to a zinc diecast part on the Valiant. And the diecasting will be continued on other cars. The magnesium housing tried on Lancers last year has been dropped. In another area, a switch from zinc to plastic for door and window regulator handles has been made on several models.

The corporation dropped SAE 430 stainless for exterior trim applications. It will use Type 433 stainless for trim above the belt line and Type 201 stainless for lower trim areas. Mr. Garwood says those materials will better resist pitting and staining.

Around 25 to 30 lb of galvanized steel will be used for inner and outer door sills on all but Chrysler and Imperial cars this year. Inner sills get equally coated stock. Outer sills are differentially coated to provide an exterior paint surface.

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	599,474	613,136
July	399,191	434,377
August	195,266	305,514
8 Mo. Totals	3,371,174	4,549,385
September	.....	407,691
October	.....	617,972
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108

Week Ended	1961	1960
Aug. 12	21,029	84,139
Aug. 19	16,948	47,437
Aug. 26	61,401	38,952
Sept. 2	90,983	51,647
Sept. 9	86,480†	52,635
Sept. 16	55,000*	85,879

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

HOB TWO FOR THE PRICE OF ONE

By switching to a lead-treated steel, Thor Power Tool Company cut the cost of these idler gears in half. Aristoloy 4620 (leaded*) provided high strength with excellent wear and shock resistance qualities. On gear cutting operations, machinability jumped from 35% to 66% (of B 1112). And there was a marked improvement in surface finish.

If you would like to know more about the production economies of lead-treated steels possible on hobbing, broaching, milling, and particularly automatic machining operations, write today for LEADED STEELS CATALOG. Or call your nearest Copperweld representative.

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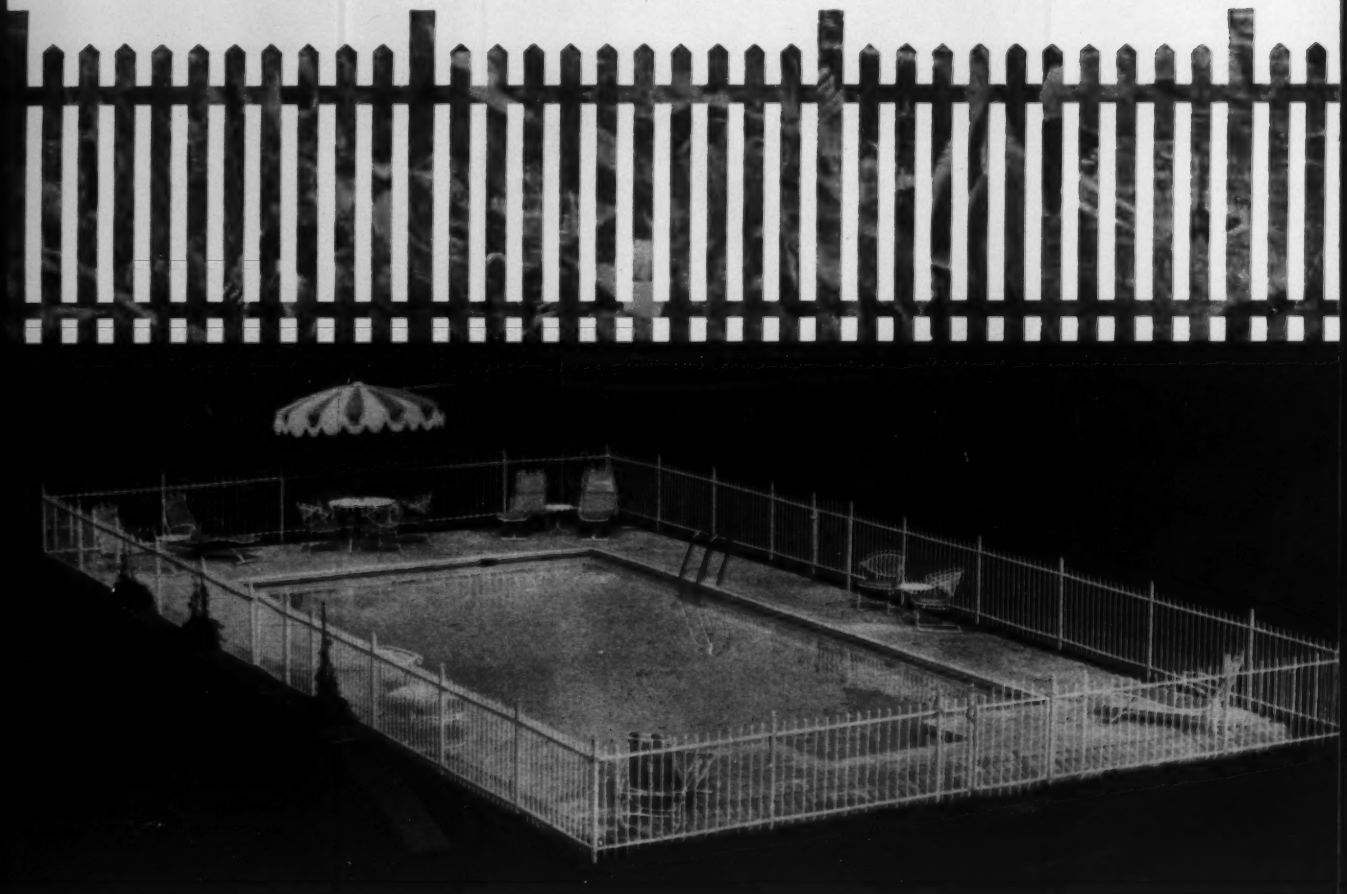
The rich look of wrought iron, yet Westmoreland's new fencing is . . .



GUARDED BY GALVANIZED STEEL

You're looking at an attractive new idea in fences from Westmoreland Metal Manufacturing Company of Philadelphia. It's a steel fence made of square tubing which duplicates the traditional appearance of wrought iron. But it costs less and virtually eliminates maintenance problems.

It's made of galvanized steel, which means lasting protection from the punishing whims of Old Man Weather. Come rain, come snow, the zinc coating stays on guard for keeps. Galvanized steel also helps hold down the price of this fence because of its low initial cost and the ease with which it can be formed into desired shapes.

WEIRKOTE® IN PARTICULAR! The galvanized steel used in this new fence line is National Steel's Weirkote. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Westmoreland president, Irving H. Kutcher, reports: "Weirkote comes through our fabricating operation without any harm whatsoever to its protective zinc coating. We never have to worry about chipping or peeling." Weirkote is manufactured by two National Steel Corporation divisions, Weirton Steel and Midwest Steel. Write Weirton Steel, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

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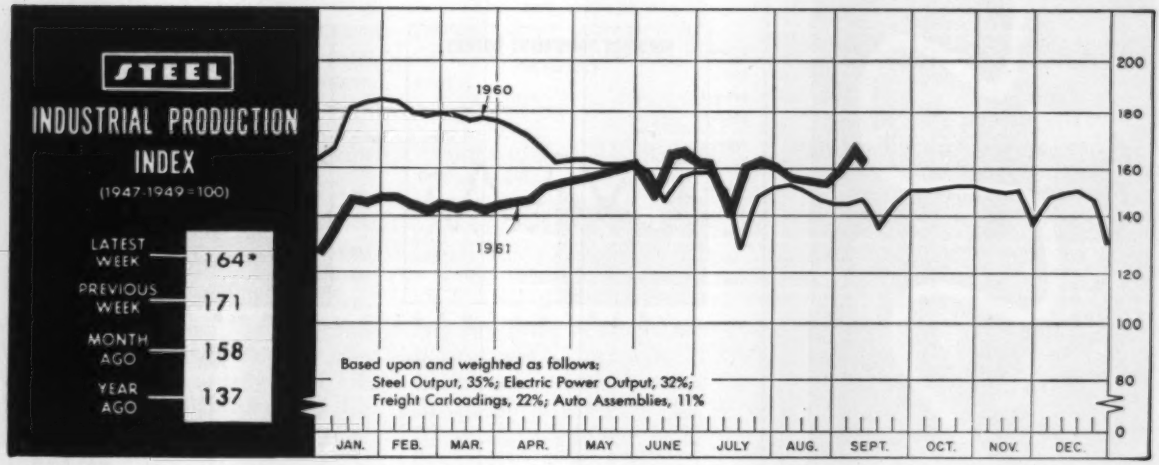

*Week ended Sept. 9.

Outlook Good Despite Weaknesses

BUSINESSMEN are gaining confidence about the long term even though several of their favorite, short term indicators failed to show much strength during midsummer.

They are evidently convinced that the expansions in industrial production and gross national product have been caused by an across-the-board strengthening of the economy. Enough of the major indicators—such as personal income, steel production, plant and equipment spending (see Page 53), new orders, length of the workweek—are moving steadily upward to ward off any doubts about the legitimacy of the upcycle. In addition, much of the pump priming done by the government during the recession is beginning to take hold.

But the fact that the over-all economy has passed the former high marks and seems to be heading for new highs in 1962 does not cover some glaring weaknesses in the pattern. Concern is expressed in many quarters that the recovery's progress in the immediate future may be slowed down unless most of these laggards show marked improvement soon.

• **Auto Sales** — August was the poorest in several years (excluding 1958) at the retail sales level. The daily average of 15,145 units was sharply beneath the 17,739 level of August, 1960. (The recession was just being recognized as such about then.) While stocks of 1961 models were lowered about 355,000 units, sales still left something to be desired as far as an indication of buyer confidence was concerned.

• **Housing Starts**—July was a disappointment for home builders. After starts showed signs of recovery in May and June, the seasonally adjusted annual rate for private houses slumped to 1,317,000 units (down 66,000 from June's figure). There is still hope that this year

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,050[1]	2,032	1,510
Electric Power Distributed (million kw-hr)	15,500[1]	16,214	14,615
Bituminous Coal Output (1000 tons)	8,220[1]	8,045	7,730
Crude Oil Production (daily avg—1000 bbl)	7,050[1]	7,051	6,874
Construction Volume (*ENR*—millions)	$268.9	$402.1	$427.2
Auto, Truck Output—U. S., Canada (*Ward's*)	110,958[1]	118,762	67,197
TRADE			
Freight Carloadings (1000 cars)	540[1]	599	481
Intercity Truck Tonnage (changes from year ago)	+2.2%	+4.6%	−0.4%
Business Failures (Dun & Bradstreet)	321	352	288
Currency in Circulation (millions)[2]	$32,663	$32,474	$32,174
Dept. Store Sales (changes from year ago)[2]	+4%	+6%	−1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,036	$24,906	$21,320
Federal Gross Debt (billions)	$293.7	$293.2	$288.7
Bond Volume, NYSE (millions)	$22.5	$27.5	$15.9
Stocks Sales, NYSE (thousands of shares)	13,786	15,164	10,852
Loans & Investments (billions, adjusted)[3]	$114.3	$114.2	$104.9
U. S. Govt. Obligations Held (billions)[3]	$33.5	$33.3	$27.4
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247 82
STEEL's Nonferrous Metal Price Index[5]	227.4	230.8	230.0
All Commodities[6]	118.8[1]	118.8	119.4
Commodities Other than Farm & Foods[6]	127.5[1]	127.5	128.3

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

BRMCO
SPECIAL ALLOYS
slash
material
costs

BRMCO-developed aluminum, brass, and bronze alloys often replace higher priced strip metals . . . cut material costs, while promoting longer tool life, fewer rejects, increased production.

A pressure gauge manufacturer, for example, cut gear segment material costs 25% by changing to a BRMCO formulated strip. The manufacturer had been using Grade A phosphor bronze; then tried leaded phosphor bronze in an effort to improve machinability, increase production. When the leaded phosphor bronze failed to do the job, BRMCO was called in and quickly developed a special bronze alloy. Labeled "LED-O-LOY," this BRMCO Strip provides this manufacturer with greater workability, machinability, and wear resistance—while reducing his material costs 25%.

BRMCO special alloys may solve your production and cost-reduction problems, too. Write or call today, outlining your requirements. If you phone, call EDison 7-4434 (Bridgeport — collect) and ask for Larry Hayden, field service department.

FINE QUALITY ALUMINUM, BRASS AND BRONZE IN STRIP AND ROLLS

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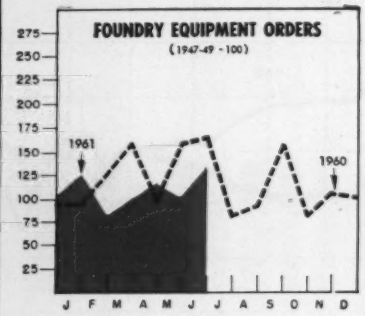
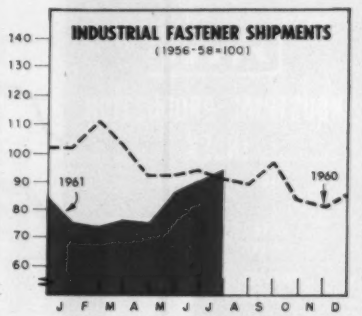
THE BUSINESS TREND



	1961	1960	1959
Jan.	123.7	95.5	127.4
Feb.	81.8	128.6	237.1
Mar.	99.1	159.9	166.6
Apr.	115.2	97.9	154.2
May	101.5	159.0	157.0
June	130.8	164.8	125.1
July	....	80.0	110.7
Aug.	....	92.4	134.1
Sept.	....	158.1	131.3
Oct.	....	81.7	140.8
Nov.	....	106.5	131.2
Dec.	....	101.2	95.9
Avg	....	118.8	142.6

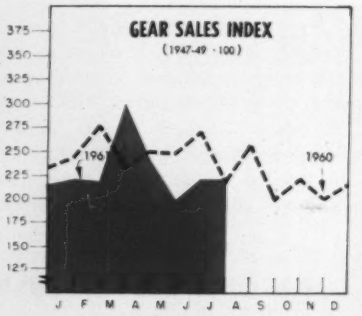
Foundry Equipment Mfrs. Assn.



(Seasonally adjusted)

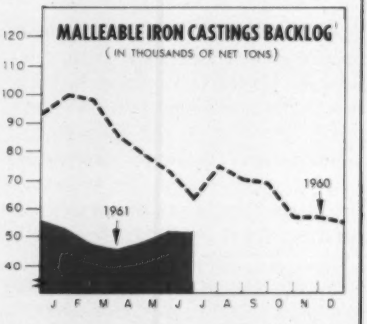
	1961	1960	1959	1958*
Jan.	75	102	99	133
Feb.	74	111	105	117
Mar.	76	103	105	103
Apr.	75	92	119	102
May	86	92	119	111
June	90	94	129	120
July	94	91	112	133
Aug.	...	89	77	120
Sept.	...	97	92	141
Oct.	...	83	83	137
Nov.	...	81	80	134
Dec.	...	85	102	152
Avg	...	94	101	125

*1947-49 = 100.
Industrial Fasteners Institute.



	Bookings 1961	Bookings 1960	Shipments 1961	Shipments 1960
Jan.	220.8	243.4	227.3	207.3
Feb.	218.3	278.6	214.4	230.2
Mar.	299.3	231.8	246.8	244.6
Apr.	241.9	249.2	233.9	234.8
May	198.0	246.9	239.1	241.3
June	220.0	269.8	245.4	253.6
July	219.8	217.5	200.1	210.8
Aug.	....	255.8	....	217.3
Sept.	....	197.9	....	223.5
Oct.	....	219.9	....	220.6
Nov.	....	198.9	....	226.7
Dec.	....	216.5	....	220.0
Avg	....	235.5	....	227.6

American Gear Mfrs. Assn.



	Shipments 1961	Shipments 1960	Unfilled Orders* 1961	Unfilled Orders* 1960
Jan.	57.7	83.2	52.2	100.3
Feb.	50.8	83.1	47.7	98.3
Mar.	58.5	86.2	45.5	84.7
Apr.	55.6	71.3	48.1	79.2
May	68.4	68.9	51.9	73.2
June	67.2	72.6	51.5	63.9
July	...	49.9	...	74.3
Aug.	...	58.8	...	69.9
Sept.	...	63.0	...	69.0
Oct.	...	63.5	...	56.6
Nov.	...	63.0	...	56.6
Dec.	...	57.2	...	54.7
Total	...	820.7		

*For sale. U. S. Bureau of the Census.

Charts copyright, 1961, STEEL.

will exceed last year in total starts, but July did little to confirm this belief.

● **Contract Awards**—The outlook for total construction, which was bullish earlier in the year, has waned somewhat as awards for new projects continue to lag the year-ago levels. *Engineering News-Record's* tabulation for the first 36 weeks of 1961 trails the year ago pace by 4 per cent.

And the difference between them has widened in recent weeks. However, *EN-R* remains bullish on the outlook for the next two years. (See Page 75.)

• **Consumer Credit** — In the past, when consumers began to extend their installment credit it was a sure sign that they had confidence in business conditions. In July, they did just the reverse. Seasonally adjusted extensions slipped from $4,402,000,000 to $3,976,000,000. While total installment credit inched up in July, it was still well below the January level.

• **Retail Sales**—In June, it looked like retail sales might be picking up in line with the rest of the economy, but July and August turned into duds. Seasonally adjusted sales last month came to only $18.1 billion, only $47 million above the disappointing June total and slightly under the March figure (which was near the bottom of the recession). The August figure also fell below the year-ago total.

• **Employment**—Getting the closest scrutiny is employment, which failed to live up to expectations this summer. By historic standards, August should have set a peak in number employed, but it fell short of the year's high mark set in June. Unemployment remained at July's 6.9 per cent of the work force (seasonally adjusted) because large numbers of students withdrew from the work force after failing to find early summer jobs.

Auto Sales to Soar

Perhaps one plus factor is the customary new model enthusiasm exuding from Detroit. Prior to the General Motors strike, estimates of retail sales during 1962 ran all the way up to 7.25 million (GM's official pronouncement). While it raised a few eyebrows, there is good reason to believe such a high estimate might prove to be short of the mark, declares James Dawson, vice president and economist for National City Bank of Cleveland. He cites four reasons:

1. The postwar trend line for retail sales (domestic and imports) has gone up an average of 3 per cent a year. An extension of this line for 1962 would yield sales of 6.9 million—"a normal year," concludes Mr. Dawson. "But," he counters, "1962 is not going to be a normal year. It will be one of vigorous expansion. GM's estimate is only 5 per cent above the normal, which seems reasonable."

2. The last half dozen upcycles showed these increases in retail sales from the preceding recession years:

1928—20%	1950—31%
1933—36%	1955—35%
1939—40%	1959—30%

The average is 32 per cent. GM's forecast shows only a 23 per cent gain over this year's anticipated sales.

3. In 1950-54, consumers spent 5.4 per cent of disposable income for cars and parts; in record auto year 1955, it was 6.7 per cent; in 1956-60 (average years), it was 5.4 per cent; this year it will be close to 4.5 per cent. If it comes back to 5.5 per cent in 1962, dealers will sell at least 7.25 million cars. (There are many persons who claim this will not happen because of competition for the consumer's dollar from boats, vacations, other leisure activities, and services.)

4. Finally, Mr. Dawson draws a yellowed sheet of paper from his drawer and says: "For the last seven years, I've kept track of what the boys in Detroit have forecast for retail sales at new model introduction time. Every time they were right in direction, but in six of the seven years, they missed the magnitude. In years of a downcycle, they never went far enough. In years of an upcycle, they fell short. I don't think anybody will argue that 1962 will be anything but an upcycle year."

Translated into production, he sees motordom assembling an even 7 million cars. Imports will account for 400,000 sales; exports will add about 150,000, and inventories will be a neutral factor.

More Records Coming for Heavy Construction

	1960 Actual	1961 Estimated	1962 Forecast	1963 Forecast
ALL HEAVY CONSTRUCTION	**$22,654**	**$23,055**	**$25,630**	**$25,575**
By Ownership				
PRIVATE	11,847	11,275	12,500	12,100
PUBLIC	10,807	11,780	13,130	13,475
State & Municipal	8,350	9,000	9,930	10,175
Federal	2,457	2,780	3,200	3,300
By Type—Public				
Waterworks	455	450	510	560
Sewerage	619	770	830	900
Bridges	794	610	650	675
Highways	3,401	4,000	4,300	4,450
Earthwork—Dams—Waterways	780	975	1,175	1,250
Buildings, Total	3,299	3,625	4,115	4,015
Other than Housing	2,564	2,800	3,250	3,100
Housing	735	825	865	915
Unclassified	1,467	1,350	1,550	1,625
Private				
Buildings				
Mass Housing	5,512	5,100	5,300	5,000
Commercial	2,539	2,850	3,200	3,400
Industrial	2,792	2,825	3,450	3,200
Unclassified	996	500	550	500

Source: *Engineering News-Record.*

Again, WESTERN ELECTRIC calls for TRS PAR Process to cut assembly costs

Economy record on wall phones duplicated on new telephone

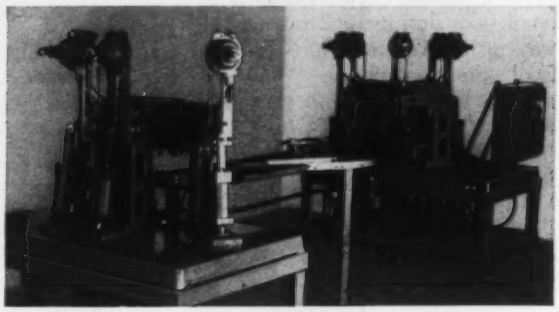
Western Electric had a ready answer for low cost assembly of the many components in the base of their new telephone. It had been developed by Western Electric engineers, with the help of TRS riveting experts, for a similar problem on wall phones.

It had paid off with a 35 percent labor saving and an 80 percent boost in production rate!

The Western Electric set-up described here is a production-proved example of what may be accomplished with the PAR Process . . . TRS Production Automated Riveting. Even though your assemblies are less complex, it will pay you to investigate the PAR Process. A TRS man may help you simplify and speed-up operations . . . minimize handling . . . decrease parts spoilage . . . through more automatic riveting and dependable quality TRS rivets. Often a TRS man can help achieve remarkable results from existing equipment. Always he'll have the style and size rivets you need.

11 Rivets Set in Complex Pattern in Only 2 Operations

Here is the specially engineered Multi-Head Riveter which helps cut costs for Western Electric. Eleven automatic riveting machines are combined with a specially designed rolling assembly fixture to minimize handling 5 parts of the assembly. In 2 operations, parts are attached to baseplate wih 11 TRS rivets in a complex pattern.



Don't Buy Riveting Machines until you learn how the TRS **PAR** *process revolutionizes riveting*

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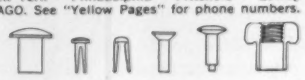
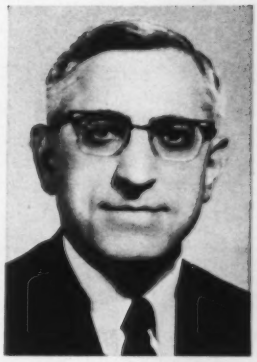
QUINCY 70, MASSACHUSETTS • TRS SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago • Cleveland Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York • Philadelphia • Pittsfield • Quincy St. Louis • Seattle. MIDWEST FACILITIES AND STOCK IN CHICAGO. See "Yellow Pages" for phone numbers.

If it's a Tubular Rivet TRS makes it . . . and Better



M. H. ZELIBOR
Great Lakes Screw v. p.

PAUL WILLIAMS
Norgren manufacturing



JOHN GALANDAK
Paterson Boiler exec. v. p.

HOLMES T. COLLINS JR.
EMP president

M. H. Zelibor was named vice president-manufacturing of **Great Lakes Screw Corp.**, Chicago. He was plant manager.

Norgren Co., Englewood, Colo., appointed **Paul Williams** head of manufacturing operations; and **Jim Machen** materials manager. Mr. Williams was superintendent of Norgren's Littleton plant. Mr. Machen was superintendent of the Englewood plant.

Charles R. Heilig was made manager of furnace products sales, **Basic Inc.**, Cleveland. **T. D. Hess** replaces Mr. Heilig as central district sales manager.

Charles C. Gates Jr. succeeds his father, the late **C. C. Gates**, as president of **Gates Rubber Co.**, Denver.

Will Mitchell Jr. was appointed director, Research Div., **Allis-Chalmers Mfg. Co.**, Milwaukee. He has served as acting director since September, 1960.

John Galandak was made executive vice president, **Paterson Boiler & Tank Inc.**, Paterson, N. J. He was engineering manager of Graver Water Conditioning Co., division of Union Tank Car Co. Previously, he had been with Graver Tank & Mfg. Co.

John J. Connolly was promoted to vice president of Litton Systems Inc., and general manager of the Data Systems Div. of **Litton Industries**, Beverly Hills, Calif.

Richard H. Wilcox was named assistant to the president of **P. R. Mallory & Co. Inc.**, Indianapolis. He succeeds **John L. Wilkes**, recently made general sales manager for the division, Mallory Metallurgical Co.

Fritz C. Hyde Jr., vice president and formerly assistant general sales manager, was made general sales manager of **Revere Copper & Brass Inc.**, New York. He succeeds **Raymond P. Winberg**, now vice president-foreign operations.

Holmes T. Collins Jr. was named president of **Engineering Metal Products Corp.**, Indianapolis. He succeeds **W. Harrison Graver**, elected chairman. **James H. Carnine**, a founder and former chairman, has retired. Mr. Collins was formerly vice president of Divco - Wayne Corp., Detroit.

Cleveland-Cliffs Iron Co., Cleveland, appointed **John B. Hollister Jr.** assistant manager, ore sales-general; and **Alexander McAfee** assistant manager, ore sales-Lake Superior.

John D. Bloom was made marketing manager for **Leach Corp.**, Compton, Calif.

Jack B. Klukkert, former assistant superintendent of the Fontana, Calif., mold foundry of Kaiser Steel Co., was appointed head of a new foundry at Indiana Harbor, Ind., Works of **Inland Steel Co.**

John Procopi was made vice presi-

CHARLES C. GATES JR.
Gates Rubber president

WILL MITCHELL JR.
A-C Research Div. dir.

FRITZ C. HYDE JR.
Revere gen. sales mgr.

JACK B. KLUKKERT
Inland foundry supt.

JOHN J. HUBER

WILLIAM G. SCHARNBERGER

Crucible's Magnet Div. appointments

R. L. HANES

E. GEORGE HARTMANN

CF&I division sales vice presidents

dent, international operations, for **Milton Roy Co.**, Philadelphia.

Crucible Steel Co. of America, Pittsburgh, appointed **John J. Huber** to the new post of general manager, Magnet Div.; and **William G. Scharnberger** to the new post of sales manager of the division. Mr. Huber was superintendent, Special Products Div., Spaulding Works, Harrison, N. J. Mr. Scharnberger was manager of Spaulding cast specialties. He will remain at the Spaulding Works.

David F. Sanders, president, Lockheed Electronics Co., Plainfield, N. J., was named a vice president of **Lockheed Aircraft Corp.**, following merger of the electronics company into the parent corporation.

Phillip R. Heim was elected a vice president of **Royal Industries Inc.**, Los Angeles, and president of its **Vard Div.** at Pasadena, Calif. He joined Vard in 1950, and has been executive vice president and general manager for the last year.

Colorado Fuel & Iron Corp., Denver, elected **R. L. Hanes** vice president - sales, Western Div.; and **E. George Hartmann** vice president-sales, Wickwire Spencer Steel Div. and John A. Roebling's Sons Div. Mr. Hanes was general manager-tubular sales. Mr. Hartmann, since 1958, has been vice president-sales for Roebling.

Alan Wood Steel Co., Conshohocken, Pa., appointed **William T. Geiger** superintendent, 110 in. rolling mill—30 in. hot strip mill; and **Robert G. Leister** superintendent, hot strip finishing and cold strip mill.

Robert E. Hess was named general manager, **ABC Scale Div.**, McDowell Co. Inc., Cleveland. He was national sales manager, Industrial Sales Div., Fairbanks, Morse & Co.

Charles E. Emmert was made director of purchasing, **Northeastern Engineering**, Manchester, N. H., subsidiary of Atlantic Research Corp. He was purchasing agent for ACF Electronics Div., Hyattsville, Md.

James F. White was made assistant purchasing agent-raw materials for **Jones & Laughlin Steel Corp.**, Pittsburgh. **William H. Rees** was made assistant to the general manager-strip sales, Stainless & Strip Div., Detroit.

Jack D. Bryan was named general manager of the newly created Speedostat Div. of **Perfect Circle Corp.**, Hagerstown, Ind.

Ralph C. Donovan was made assistant works manager, **Anaconda Metal Hose Div.**, Anaconda American Brass Co., Waterbury, Conn. He is succeeded by **Eugene W. Hogan** as plant manager, Mattoon, Ill.

B. B. Frost, sales manager, Metals Div., **Arthur G. McKee & Co.**, Cleveland, was named vice president-sales for the division.

Dr. Conrad A. Parlanti was made technical director for **General Com-**

PHILLIP R. HEIM

Royal Industries v.p.

ROBERT E. HESS

ABC Scale gen. mgr.

CHARLES E. EMMERT

Northeastern Eng. post

B. B. FROST

McKee-Metals Div. v. p.

HOW TO TAKE THE EDGE OFF A HEADACHE

KUTWELL® EP 66 is a new high-quality, water-soluble cutting oil designed to do the tough jobs—cutting special alloys and high-strength tool steels. Its powerful, extreme pressure agents take the toughest cutting, grinding, and drilling jobs in stride. Pieces per tool grind have jumped dramatically when Kutwell EP66 was used instead of higher-cost specialty oils. Machine tool lubrication and rancidity control are effectively maintained.

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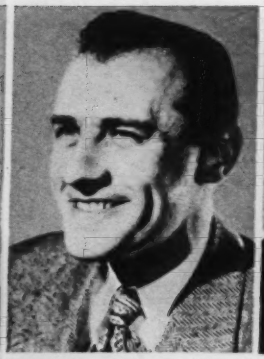
HUMBLE OIL & REFINING COMPANY Esso

C. V. CROCKETT
GMC defense prod. dir.



GEORGE J. GROYA
Rockwell-German plant mgr.

PAUL E. ATKINSON
Sun Shipbuilding pres.

HERMAN O. THOMAS
Gabriel sales adm. mgr.

JAMES A. CURRIE
Willys Motors planning

FREDRICK A. PITSCHKE
H-VW-M div. sales

CLARENCE P. FOREMAN
Baird Machine chf. eng.

RAYMOND M. BEACHA
Union Spring sales mgr.

CYRIL GALBRAITH
Armco-Latin American dir.

munication Co., Boston. He remains a vice president.

Clarence P. Foreman was made chief engineer, **Baird Machine Co.**, Stratford, Conn. He was chief tool engineer.

Raymond M. Beacha was named manager of spring sales for **Union Spring & Mfg. Co.**, New Kensington, Pa. He was chief engineer.

Cyril Galbraith, former president and general manager of C. A. Armco Venezolana (Armco Steel Corp.), was named regional director in Northern Latin America for **Armco International**. He has headquarters in Middletown, Ohio.

W. L. Milliren was made supervisor of production control at the Joliet, Ill., Works of **American Steel & Wire Div.**, U. S. Steel Corp.

C. V. Crockett was made director of defense products, and **H. O. Flynn** chief engineer of **GMC Truck & Coach Div.**, Pontiac, Mich., General Motors Corp.

George J. Grova, product manager of **Rockwell Mfg. Co.'s** woodworking power tools, was named manager-power tools, Germany. He heads production of tools manufactured by the West German subsidiary (Rockwell G.m.b.H.) and sale of those products in West Germany, with headquarters at the Pinneberg plant.

Paul E. Atkinson was elected president, **Sun Shipbuilding & Dry Dock Co.**, Chester, Pa., to succeed **Richard L. Burke**, retired. Mr. Atkinson was vice president and director of operations. **Arthur A. Holzbaur** was elected vice president-operations; **Robert Galloway** vice president-sales; **Charles Zeien** vice president-engineering. **Charles H. Doyle**, succeeds **William Craemer**, retired, as secretary-treasurer.

Herman O. Thomas was made manager of sales administration, **Gabriel Co.**, Cleveland. He was sales manager for Briggs Replacement, and is succeeded by **William K. Schaefer.**

James A. Currie was promoted to the new post of director of corporate planning at **Willys Motors Inc.**, Toledo, Ohio.

Fredrick A. Pitschke was made sales manager, Electrochemical Machining Div., **Hanson-Van Winkle-Munning Co.**, Matawan, N. J.

OBITUARIES...

William T. Adams, 61, vice president and manager of purchases and raw materials for **Republic Steel Corp.**, Cleveland, died Sept. 5.

H. Gordon Nelson, 64, senior vice president, **Edward Valves Inc.**, East Chicago, Ind., died Aug. 31.

John R. Freeman, 65, metallurgical consultant to Anaconda Sales Co., New York, and retired vice president-research at **Anaconda American Brass Co.**, died Sept. 2.

R. M. Naley, vice president, **Aluminium Ltd. Sales Inc.**, New York, died Sept. 6.

. . . for one thing, they're kicking yesterday's production costs into a cocked-hat.

What's more, it's the pushbutton automated foundry that is supplying automotive manufacturers with connecting rods, crank and cam shafts. It's the pushbutton foundry that can meet the price and delivery demands of the plumbing and appliance industries.

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SPO, as the world's largest supplier of foundry molding machines and related equipment, will continue research, engineering and production of mechanized systems that will provide the foundry with the competitive edge. If you would like technical information or assistance relating to the industry we serve, please contact SPO, INCORPORATED, 7500 Grand Division Ave., Cleveland 25, Ohio. Telephone Diamond 1-3666.

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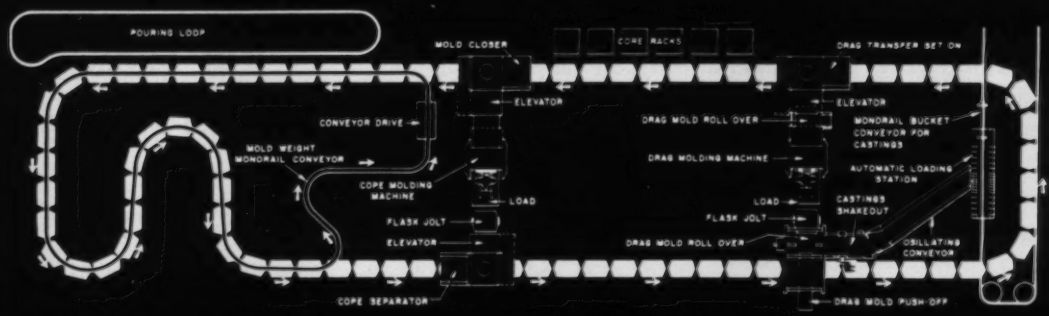
LOOK WHAT PUSHBUTTONS ARE DOING IN THE FOUNDRY



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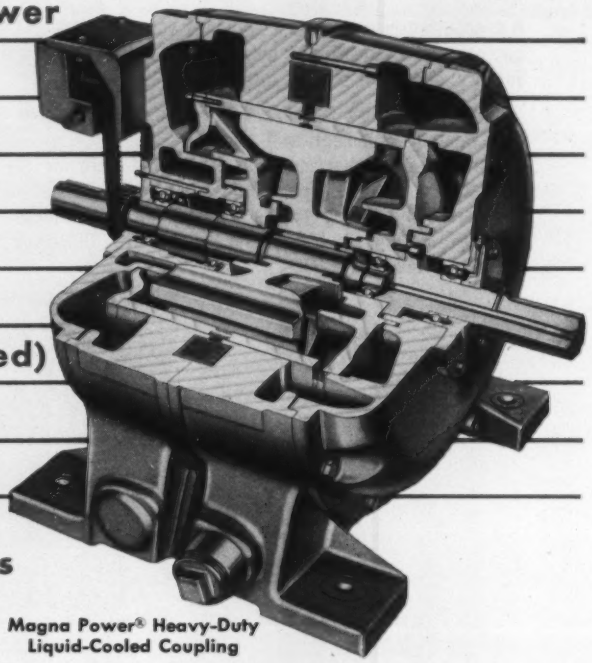

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Dynamatic Eddy-Current Equipment is available in sizes from ¼ hp Ajusto-Spede Drives to heavy-duty Magnapower Couplings rated up to 20,000 hp—and larger.

Place your speed control problems in the hands of experts. Our representatives, located in all principal cities, are fully qualified to discuss your speed control problems and suggest Dynamatic Equipment that will do the best job for you. Call Dynamatic today—there is no obligation.

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Republic Steel Expanding Bright Annealing Facilities

THE RAPIDLY GROWING importance of bright annealed, stainless steel for flat rolled applications in the automotive and other industries has prompted Republic Steel Corp. to enter the field. The company will establish a large, bright annealing facility at Massillon, Ohio.

It will be capable of turning out sheets up to 60 in. wide and 3/16 in. thick. The unit (annual capacity: 55,000 tons) is scheduled to be operative in late January, 1962. The company has the necessary mill and processing equipment to produce standard finishes of stainless steel in widths up to 72 in., inclusive.

Republic recently started to operate a smaller, vertical, bright annealing line at Massillon which handles stainless steel strip up to 24 in. wide in thicknesses of 0.008 to 0.070 in. Annual capacity is 24,000 tons. The 24 in. furnace can handle all of Republic's Enduro grades.

Automakers are swinging more and more toward bright annealed stainless for trim, wheel discs, and other items, officials of the company say. The appliance, utensil and cutlery, food preparation, serving and sanitary equipment fields represent a rapidly expanding market.

In the consumer area, kitchenware, cookware, flatware, hospitalware, and decorative trim for appliances are listed as growing markets. Officials point out that in many cases, bright annealed stainless needs little or no buffing and polishing after forming.

Dravo Gets Inco Contract

International Nickel Co. of Canada Ltd., Copper Cliff, Ont., has awarded Dravo Construction Ltd., Toronto, Ont., a multimillion dollar contract to design and construct a pelletizing facility at its Copper Cliff plant. The project will include changes in a pelletizing plant and is part of a $50 million expansion program recently undertaken by the company. When completed early in 1963, the rated capacity of the entire pelletizing facility will be 900,000 net tons of high grade (68 per cent iron content) iron ore pellets, produced from 1.2 million tons of nickeliferous pyrrhotite. Dravo's contract will also include installation of storage tanks, adding 5000 tons of slurry storage to the present 2000 tons.

Valk Enlarges Plant

Valk Mfg. Co., Carlisle, Pa., is expanding its Pell City, Ala., plant from 10,000 sq ft to more than 20,000 sq ft of manufacturing area. J. H. Hippensteel is vice president and general manager of the Pell City plant which makes snow plows, grader blades, and cutting edges.

Kahr Gets Export Business

Kahr Bearing Corp., New York, has been awarded a contract to supply bearings to aircraft manufacturers in West Germany and the Netherlands — they have been licensed by Lockheed Aircraft Corp. to assemble and manufacture aircraft and aircraft components for the Lockheed, F104, NATO program.

Rea Magnet Wire Builds

Rea Magnet Wire Co. Inc., a subsidiary of Aluminum Co. of America, Pittsburgh, is constructing a plant in Ft. Wayne, Ind., for the manufacture of aluminum magnet wire. Cost: $750,000. The 100,000 sq ft facility will supplement the production operations of Rea's main plant, also in Ft. Wayne.

Werner Boosts Capacity

R. D. Werner Co. Inc., Greenville, Pa., is erecting a 53,000 sq ft addition to its plant. Expansion plans involve the installation of special, high speed equipment which will greatly increase the firm's output of aluminum products (ladders, planks, stages, scaffolds, metal trim, and sink frames).

Invests in Canadian Firm

Dominion Brake Shoe Co. Ltd., subsidiary of American Brake Shoe Co., New York, acquired a minority interest in Jarry Hydraulics Ltd., Montreal, Que. The Canadian firm makes aircraft landing gear and steering systems and other airborne hydraulic equipment.

Nitrogen Plant Opened

A new type of automatic plant for the production of high purity nitrogen in gas or liquid form is in operation. The firm, Superior Air Products Co., Newark, N. J., is making nitrogen of 99.999 per cent purity under a license with Petrocarbon Developments Ltd., London.

Forms Steel Products Div.

I. Richman & Co. Inc., Washington, Pa., has formed a Steel Products Div. The 100,000 sq ft service center will stock hot and cold rolled carbon, stainless and alloy steels, wire, pipe, structurals, culverts, and other general steel warehouse products. N. J. Rash is general manager of the new division.

Plans Pipe Coating Plant

Bannister Construction Co. Ltd., Edmonton, Alta., will build a $250,000 pipe coating plant at Coalburg, Ohio. The plant is scheduled for completion about Nov. 1 and will have an annual capacity to coat up to 15 million ft of steel pipe. The resin will be furnished by Minnesota Mining & Mfg. Co., St. Paul.

Wellman Enlarges Plant

S. K. Wellman Co., Bedford, Ohio, has doubled the productive capacity of its Metallic Clutch Plates, Facings, and Brake Block Divisions. The products are used in trucks, construction and farm machinery, and aircraft and industrial equipment. The firm is substantially increasing output of its all-metal brake lining for passenger

(*Please turn to Page* 86)

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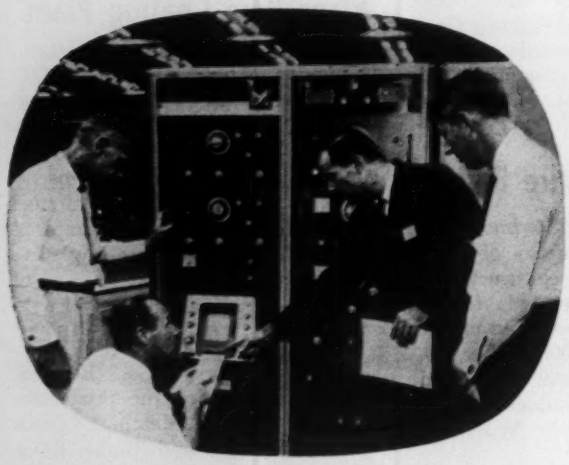


Planned testing of critical tubing ¼" to 6" O.D. with eddy currents. Magnatest FW-400 is used here for both research and production testing of stainless steel and aluminum tubing. It is one of a broad line of Magnatest units testing nonmagnetic tube, rod and wire—for seams, inclusions, voids, concentrated porosity, embrittled areas, slivers, laps, etc. Defects are reported on the scope and/or other readout, at mill speeds if necessary.

Photo courtesy GENERAL DYNAMICS/FORT WORTH

Planned testing of rocket motor solid fuel chambers. This specially researched and developed Magnaglo unit provides multi-directional magnetization for positive detection of all crack-type defects. In designing specialized-purpose units like this for inspection of highly critical components and parts, Magnaflux draws upon an impressive background of hundreds of thousands of man hours spent in its own R & D, and experience in planned engineering of test equipment for virtually every industrial need.

NDT*: Nondestructive Testing works best and saves you most when it is planned for at the beginning—not added at the end.

NDT can help assure reliability of your finished products, of course. But your greatest benefits come when adequate testing considerations are introduced as early as possible in the R & D and design stages, with more thought given to filling missions than filling arbitrary specifications. It is no longer enough to keep defective parts and machines off the launching pad, or out of the airplane—or even out of the production line. Test practices must consider the need of the end use of the item, using the best test method, regardless of its type.

Such benefits in reliability—and production savings, too—can be realized every day, with Magnaflux Test Systems planned for and used at every stage from first concept to full production testing. Whether for large volume, or few-of-a-kind critical parts, or prototypes, Magnaflux offers you the widest variety of different test systems and methods.

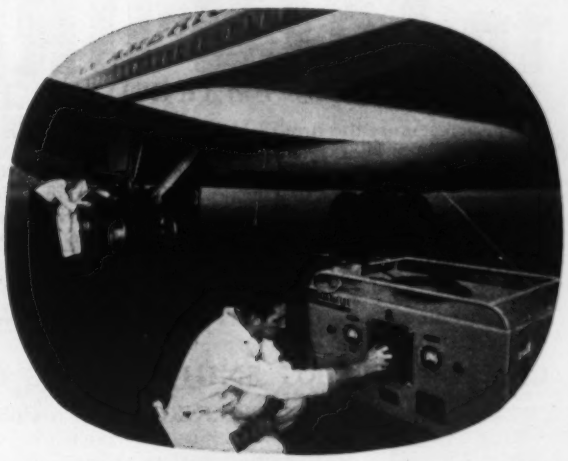
A few typical examples are shown here. Many others could be. For your own requirements—however commonplace, critical or specialized—there is usually a Magnaflux Test System. Call your Magnaflux Field Engineer—or write Magnaflux Corporation, 7312 W. Lawrence Avenue, Chicago 31, Illinois.

MAGNAFLUX CORPORATION
TEST SYSTEMS

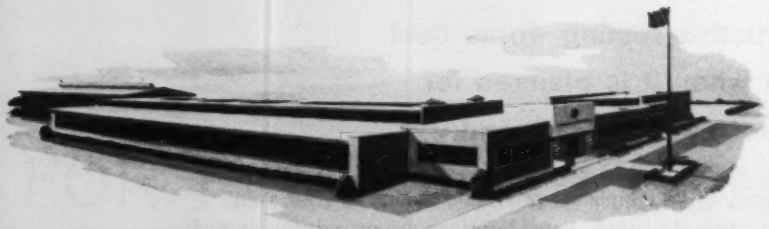
A SUBSIDIARY OF GENERAL MILLS

MAGNETIC PARTICLE • FLUORESCENT PENETRANT • ULTRASONIC • EDDY CURRENT • STRESS ANALYSIS RADIOGRAPHY • DYE PENETRANT MAGNETIC FIELD MEASURE • THERMOGRAPHIC

Planned testing of bearing cages. This is a specialized, automated Zyglo Fluorescent Penetrant System with which one man tests up to 375 nonferrous bearing cages per hour for cracks, porosity or leaks. It includes complete conveyorized handling and programmed processing, custom engineered and built by Magnaflux. Parts tested range from ¾" I.D. to 10" O.D. Twenty-six different Zyglo Penetrants have been developed by Magnaflux to produce precise, 100% reproducible results, assure sensitivity to meet all needs.



Planned apron check of a jet liner's main gear is made with Magnaflux KCH-3D and black light. Such tests are routine to assure safety on major airlines serving throughout the world. Magnaflux units like this are versatile, and are also used in all sorts of industrial maintenance operations as well as in production testing of large castings, structural weldments, etc. Photo is of Pan American Boeing 707 at Idlewild Airport, New York.



MATHIAS KLEIN & SONS INC CHICAGO MODERNIZES ITS FORGE SHOP

(Above) Six of the ten CECO-DROPS in Mathias Klein forge shop

One of the new CECO-DROPS

with 10 CECO-DROPS

REPLACING 13 BOARD DROP HAMMERS

The over-a-century-old firm of Mathias Klein & Sons, Inc., manufacturers of tools of the highest quality for lineman, electricians, and mechanics—drop-forged tools like pliers, wrenches and climbers—has kept abreast and ahead of the times by constantly improving their facilities for producing these fine products. Their forge shop, one of the best in the country, formerly equipped with 13 board drop hammers, has, over recent years, been completely converted to Ceco-Drops. 10 Ceco-Drops now do the work formerly done by the 13 board drops, with less maintenance, greater safety and easier operation. Many other forge shops all over the country are converting to Ceco-Drops, on the basis of proven performance. How about yours?

CHAMBERSBURG ENGINEERING COMPANY

CHAMBERSBURG PENNSYLVANIA

A new bulletin, fully describing the Ceco-Drop, is just off the press Write for a copy of Bulletin 105-L-1

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

(*Concluded from Page* 83)

cars. Total production area of its Bedford plant has been increased to more than 300,000 sq ft.

Connors Steel Expands

Connors Steel Div., Birmingham, H. K. Porter Company Inc., is constructing a 40,000 sq ft reinforcing bar fabricating facility at its Birmingham Works. The $500,000 project is scheduled to be completed this fall. The area vacated by the present bar fabricating operation will be utilized to improve the efficiency of other processing activities.

Enters Ball Bearing Field

KuBar Inc. has been organized to manufacture precision miniature ball bearings at 21 Erie St., Cambridge, Mass. T. P. Barnard is president and general manager; P. A. Kulin, treasurer. A 15,000 sq ft plant will be equipped with high precision machine tools and will have a metallugical research laboratory.

Premier Buys Casting Unit

Premier Steel Mills Ltd., Edmonton, Alta., will install a two strand, continuous billet casting machine which will annually provide steel for 75,000 tons of finished products. Koppers of Canada Ltd., a subsidiary of Koppers Co. Inc., Pittsburgh, will design the unit and supervise erection and startup. Premier Steel operates a two furnace, electric melting shop, casting billet sized ingots for rolling in a merchant bar mill. Products: Reinforcing bars, merchant bars, and low alloy specialties.

Bunting Brass Modernizes

Bunting Brass & Bronze Co., Toledo, Ohio, has launched a two and one-half year modernization program. Aims include a broadening of product lines into hard bronze alloys (such as manganese and aluminum bronze) and strengthening of the company's position in the structural part field—it has a sintered metal plant at Kalamazoo, Mich. Modernization of the foundry, including replacement of melting and molding equipment, is

TYLER OFFERS UNIQUE TECHNICAL SERVICE IN SCREENING

An abrasive manufacturer wanted to know how to separate his raw material in several different grit sizes—sent a sample to the Tyler Customer Service Laboratory. Here the material was separated on production-size vibrating screens, with a variety of wire cloth types, permitting positive recommendations on equipment and wire cloth for each specification desired.

This type of technical service will help you obtain—in your own plant—the lowest possible screening cost. Call Tyler for help on your separation problems. From thousands of types of Tyler woven wire cloth, we can recommend the right type for your requirements.

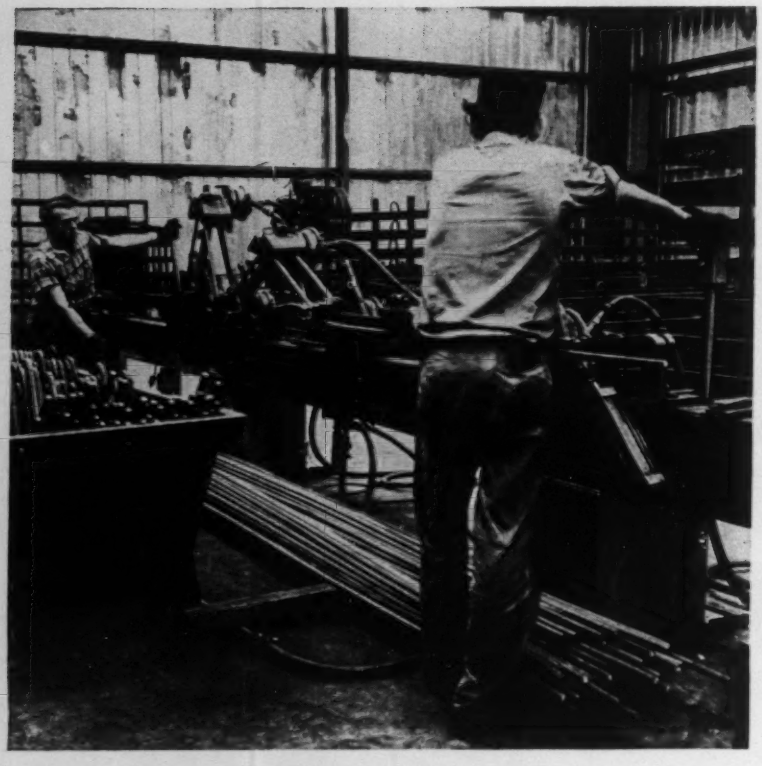
TYLER

Standard of the world Tyler Standard Testing Sieves are recognized world-wide as the standard for classification of granular materials. This testing equipment tells you what sizes are present in raw materials, relative proportions, and helps you meet specifications and control quality.

TYLER CUTS YOUR COST OF SCREENING

• Requirements matched from world's broadest line of wire cloth • Fast shipments from the industry's largest inventory • Technical service backed by unique Customer Service Laboratory.

THE W. S. TYLER COMPANY *Cleveland 14, Ohio* • OFFICES: Atlanta • Boston • Chicago • Dallas • Los Angeles • New York • Philadelphia Pittsburgh • Salt Lake City • San Francisco • The W. S. Tyler Company of Canada, Limited, St. Catharines, Ontario • OFFICE: Montreal



"WE BEND BAR JOIST WEBS THREE TIMES AS FAST"

Arthur S. Guille, Pres., Guille Steel Products Company, Norfolk, Va., says, "Prior to our purchase of a Zig-Zag® Web Bender, all webs were bent by hand, one bend at a time on a horizontal plane. It was necessary to move bar stock forward and flip it for each successive bend. The resulting web often lacked evenness in panel point spacing, causing delays on the welding assembly line.

"The Zig-Zag Web Bender bends webs three times faster than our previous method with no increase in personnel. Webs are completely bent in 45 secs. to 2½ minutes, depending on the size of the web. In addition, we get much greater accuracy in depth, pitch and radius of our bends 8" to 24". This means faster, stronger welds."

If you bend bar joist webs, contact National Bending Machinery Corp. today for more information about continuous bending with a Zig-Zag Web Bender.

N B M

National Bending Machinery Corp.

102 STATION STREET • JOHNSTOWN, PA.

scheduled for completion by the first of 1962.

Chicago Firm to Move

American Concrete Corp., Chicago, plans to move its manufacturing facilities and offices to a newly acquired plant on Dahringer Road, Waukegan, Ill. Occupancy of the 100,000 sq ft facility is scheduled for late October.

NEW OFFICES

Thompson Ramo Wooldridge Inc., Cleveland, opened a regional office at 200 E. 42nd St., New York, to market the firm's numerical control systems for machine tools. J. J. Childs is Eastern regional manager for Industrial Control Systems, Michigan City, Ind., a division. Another division, TRW Computers Co., is also at the New York address.

Hydrometals Inc., New York, opened a sales office at 334 S. Hobart Ave., Los Angeles 51, Calif. W. A. Johnson is manager. The firm produces a zinc-copper-titanium alloy, Hydro-T-Metal.

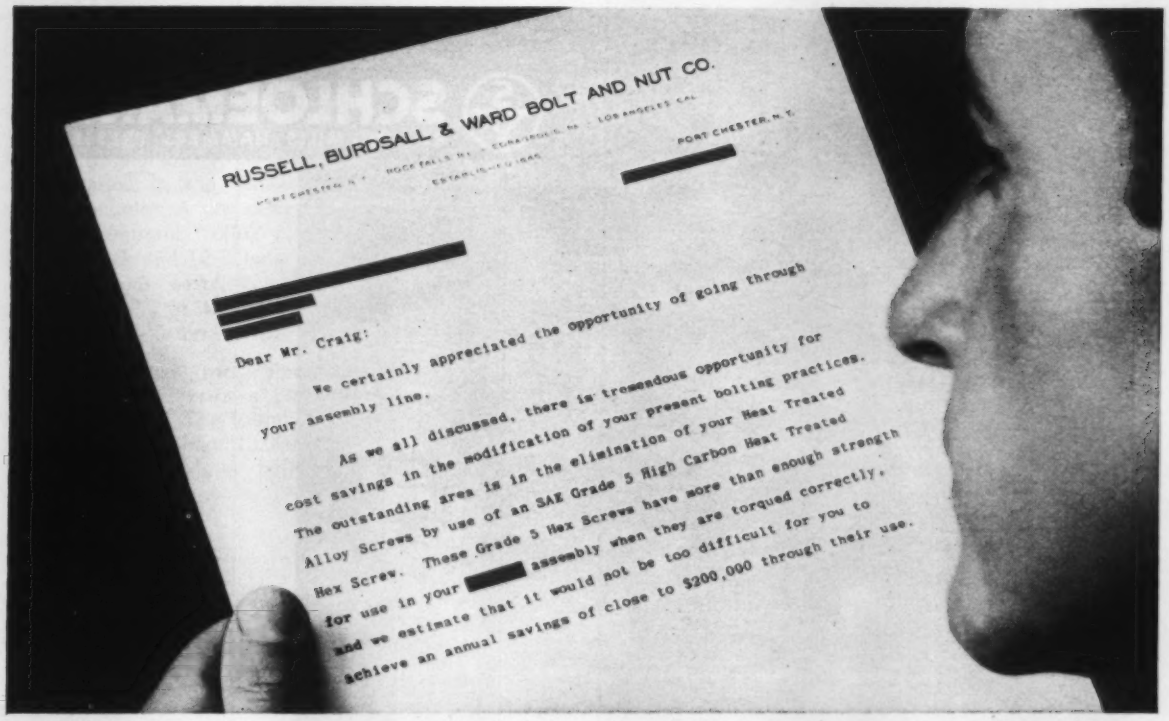
NEW ADDRESSES

Western Litho Plate & Supply Co. has relocated its offices and manufacturing operations in remodeled facilities at 4041 Park Ave., St. Louis. The company makes aluminum plates and chemicals for lithographers.

Precision Castings Corp. moved into larger quarters at 21620 Cooldige, Oak Park (Detroit 37), Mich. Induction furnaces with melting capacity up to 3000 lb per heat and special equipment for producing castings by the Shaw process have been installed in the 10,000 sq ft plant. The corporation is an affiliate of Detroit Industrial Products Corp.

NEW PLANTS

Latrobe Steel Co., Latrobe, Pa., opened a steel service center in Indianapolis, handling tool and die steels in all standard sizes and


RUSSELL, BURDSALL & WARD BOLT AND NUT CO.
PORT CHESTER, N. Y.
Dear Mr. Craig:
We certainly appreciated the opportunity of going through your assembly line.
As we all discussed, there is tremendous opportunity for cost savings in the modification of your present bolting practices. The outstanding area is in the elimination of your Heat Treated Alloy Screws by use of an SAE Grade 5 High Carbon Heat Treated Hex Screw. These Grade 5 Hex Screws have more than enough strength for use in your [redacted] assembly when they are torqued correctly, and we estimate that it would not be too difficult for you to achieve an annual savings of close to $200,000 through their use.

Eliminates big waste of dollars

Fastener value analysis study by RB&W reaps rewards without design changes

You see above an excerpt from a letter written to a large manufacturer by an RB&W technical advisor. Subsequently he submitted two detailed reports to document how savings could be achieved.

Because of the nature of the product involved, the manufacturer didn't want to make engineering changes. They preferred an alternative RB&W recommendation—substituting the proper standard screw in place of alloy screws—size for size. The cost reduction made possible: nearly $100,000 annually!

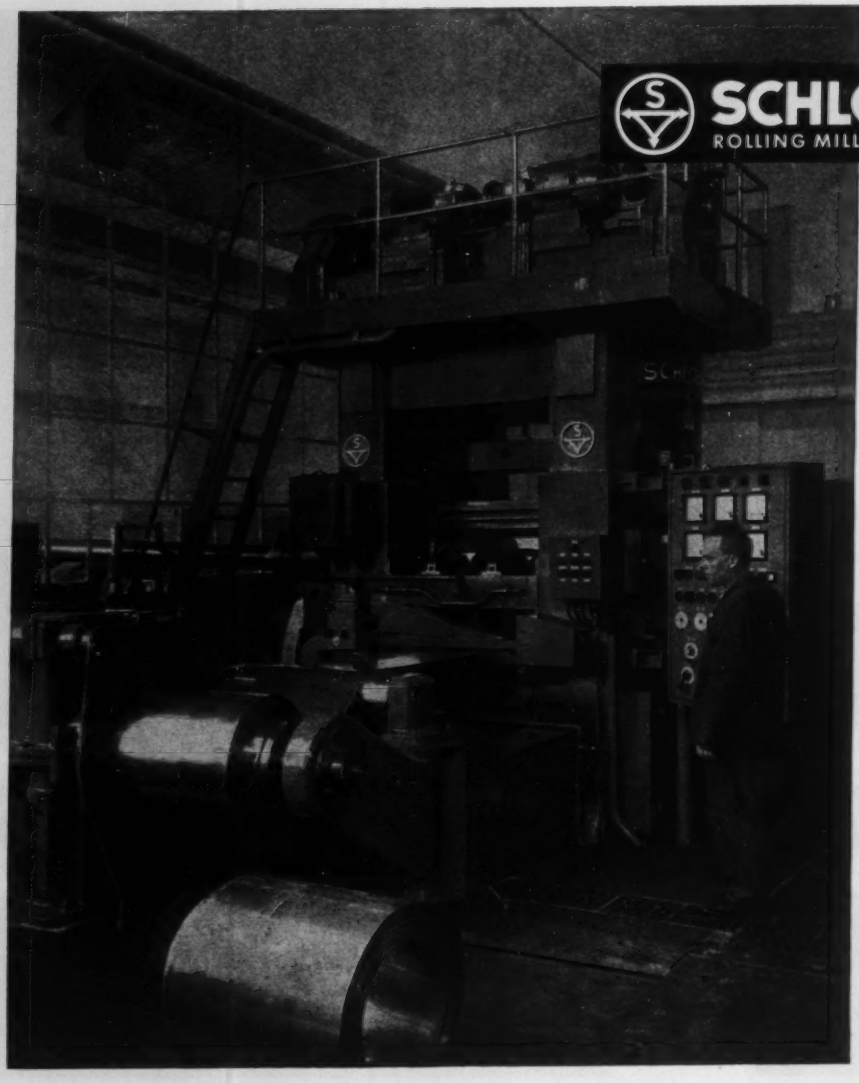
Opportunity for savings may not be so great at your plant. But they're bound to be worthwhile.

For instance, the difference in cost between a $\frac{3}{8}$ x 1 socket-head screw and a bright hex screw is about 5¢. Not much of a saving in itself. But suppose you use 150 of these socket-head screws in just one product. The saving is $7.50 per unit. If you produce 1000 units each year, that's savings of $7,500. With a line of ten such products, the *profits* saved would conceivably be $75,000 or more.

This is "value analysis" with a high dollar dividend. Take advantage of it by consulting with an RB&W Fastener Specialist. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

R B & W
117th year

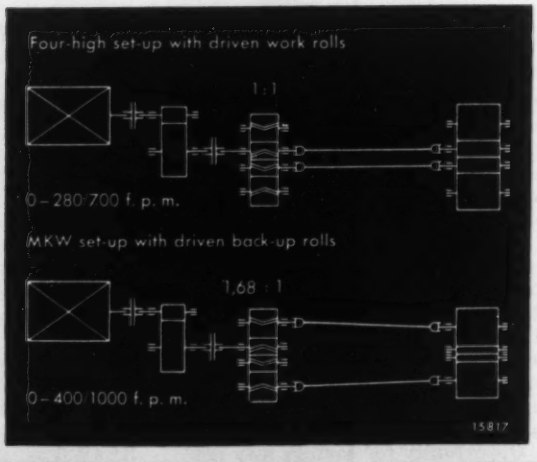
Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Sales office and warehouse at:** San Francisco, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas.



MKW cold rolling mill for 25 in. wide strip

MKW Rolling Mills
High Production, Ready Adaptability

SCHLOEMANN-designed mills for cold rolling narrow and medium strip are equipped for multi-purpose application with a two-high set-up for roughing and an MKW set-up featuring unilaterally supported work rolls in conjunction with driven back-ups for finish-rolling. A four-high set-up with driven work rolls can be used for roughing wide strip. This means that the diameter of the work rolls can be selected to best suit the particular rolling program.



FELLER ENGINEERING COMPANY 1191 Empire Building, Pittsburgh 22, Pa.

grades. Don R. Schuck is sales representative under the new operation.

Reynolds Aluminum Supply Co. of California, Los Angeles, opened a $350,000 warehouse and office building in San Diego, Calif. Equipment housed in the 30,000 sq ft facility includes: A saw designed to handle aluminum tooling plate up to 8 in. thick and 12 ft long, shearing equipment which can handle sheets up to 1/4 in. thick and 12 ft long, and two, 5 ton cranes.

Sanford Truss Inc., Pompano Beach, Fla., will erect a plant at Burlington, Ont. The initial building will contain about 12,000 sq ft. The company produces light steel roof trusses.

CONSOLIDATIONS

Textile Machine Works, Reading, Pa., purchased **Schooler Mfg. Co. Inc.,** Pacoima, Calif., manufacturer of wrapping and banding machines. The Schooler operations will be moved to Reading.

Controls Co. of America, Schiller Park, Ill., acquired **Thermac Co.,** Corona, Calif., and will operate it as the Thermac Gas Div. Thermac makes gas controls and will assume production of those made by Controls Co.'s Heating & Air Conditioning Div., Milwaukee.

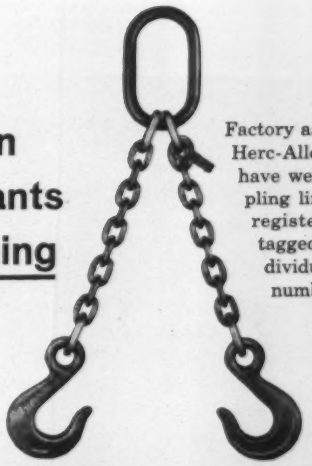
Air Products & Chemicals Inc., Allentown, Pa., acquired **Delta Oxygen Co. Inc.,** Memphis, Tenn. Delta makes oxygen, nitrogen, argon, acetylene, hydrogen, and welding and cutting equipment.

Cantor Co., Miami, Fla., will be merged into **Seaporcel Metals Inc.,** Long Island City, N. Y., subject to approval of stockholders. The surviving company will be known as Seaporcel Inc. with H. N. Schwarz president and J. A. Cantor chairman of the board. Seaporcel makes architectural and marine porcelain products.

Regent Equipment Mfg. Co., Rexdale, Ont., has been sold to **Marquette Corp.,** Minneapolis. The Canadian firm makes battery charg-

(*Please turn to Page* 94)

For the man who wants everything in chain



Factory assembled Herc-Alloy Slings have welded coupling links... are registered and tagged with individual serial numbers.

HERC-ALLOY
SLING CHAINS

- high resistance to impact loading
- maximum safety for overhead lifting
- lighter weight for easier handling
- long life on toughest jobs

Herc-Alloy is the original alloy steel chain...was the first to be tested, registered and guaranteed in slings ...was the first to be permanently branded with embossed make and grade marks... has been the favorite of many experienced chain buyers since 1933.

Send for the Herc-Alloy Data Book — includes valuable information on the selection, care, use and inspection of slings.

NEED SLINGS IN A HURRY!

Make up your own quality slings with genuine Herc-Alloy components (chain, master links and hooks) and Hammerlok coupling links, all quickly available from your CM Distributor. No peening, no welding. Simple, safe. Ask for Hammerlok instruction folder.

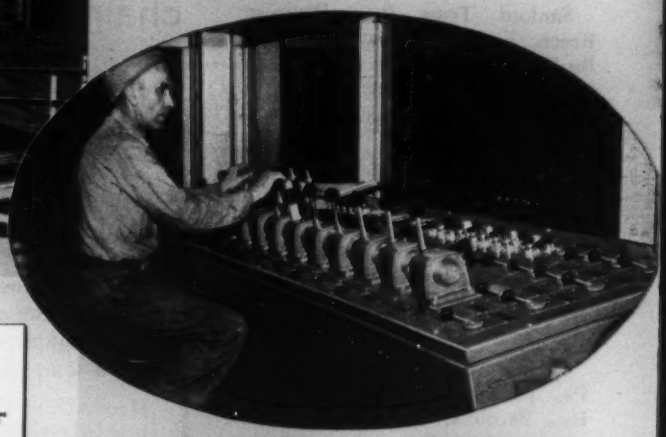
Call your CM chain distributor

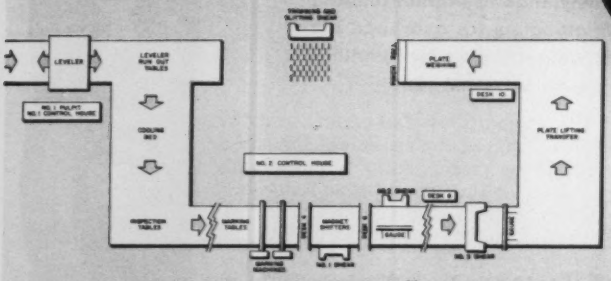
COLUMBUS McKINNON CHAIN DIVISION
COLUMBUS McKINNON CORPORATION
TONAWANDA, N. Y.
NEW YORK (Mountainside, N. J.) • CHICAGO
CLEVELAND • SAN FRANCISCO (Factory Branch)
In Canada: COLUMBUS McKINNON LIMITED, ST. CATHARINES, ONTARIO

HERC-ALLOY®
HAMMERLOK®

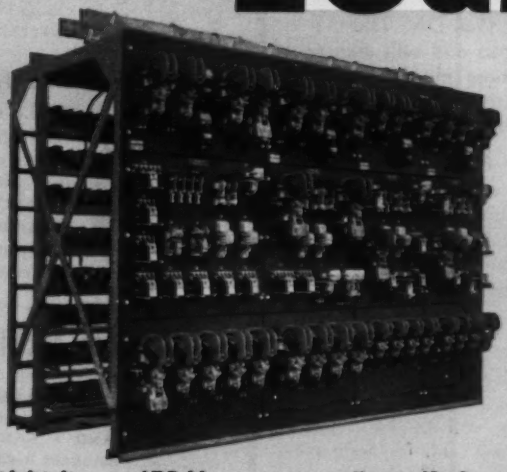
RUGGED • DURABLE
CM® CHAIN

Initially, as shown in the flow diagram, plate starts through the Leveler. The operator, located on the second floor of the No. 1 control house, has a commanding view of the entry and delivery sides of the mill.





EC&M

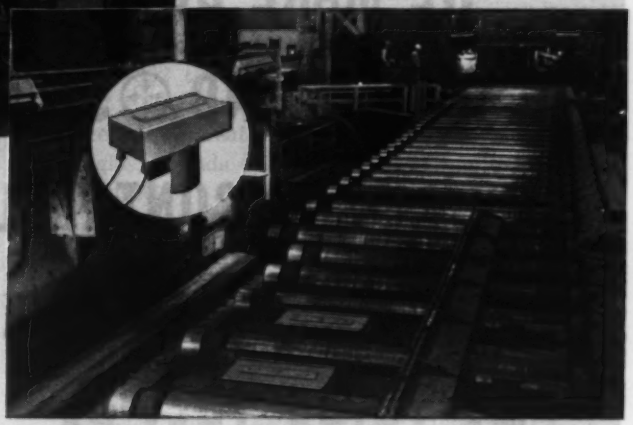


At left is line-up of EC&M magnetic controllers in No. 2 control house. All controllers were factory-assembled *(above)* to speed installation and cut costs. Completely wired sections were placed in position and bolted together. Floor channels assured easy alignment. Overhead connecting bus also simplified and speeded installation.

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

"STATA" Control provides velvet-smooth operation from 0 to 200 feet per minute of the plate-marking machines. Compact EC&M control desk with knee room for the operator controls all motions and includes Productimeters showing lengths and widths for marking plates. A reversing switch enables the Productimeters to read in either direction, so that the marking machine works both ways...no non-productive trips.



EC&M Type P Magnet Shifters line up plate edges against gauge-bar for accurate shearing. To avoid surface mars, plate is raised above rolls during these shifting or shearing operations.

Control and Magnets help boost production, improve economies, on Bethlehem's 134" Plate Mill

Highlights of the 134" Plate Shearing Line at Bethlehem Steel Company's Johnstown, Pa., plant are shown on these pages. EC&M was selected to engineer and build all control apparatus and magnets and to coordinate motor requirements. Numerous control problems were effectively resolved by EC&M Control Engineering and the complete operation resulted in economical and efficient production of plate. EC&M's long experience in steel mill applications paid off in quick start-up with minimum tune-up time.

***The Complete Story** of this installation is told in detail in Brochure 6609-45*
Send for your copy

wherever electricity is distributed and controlled

7060

THIS IS SHOT

AND THIS IS GRIT.

WE MAKE BOTH

IRON AND STEEL*.

QUALITY IS CONTROLLED

OF COURSE.

WE THINK THEY'RE

THE MOST

"PERSUASIVE ABRASIVES"

MONEY CAN BUY.

OUR CUSTOMERS DO,

TOO.

*Made in our modern electric furnaces.

CLEVELAND is the name and the place for PERSUASIVE ABRASIVES

CLEVELAND METAL ABRASIVE COMPANY

World's Largest Production Capacity

GENERAL OFFICE: 888 East 67th Street • Cleveland 3, Ohio

2560-CMA PLANTS: AT Howell, Michigan; Toledo; Cleveland • Teletype: CV 901

(*Concluded from Page 91*)

ers and motor tune-up equipment and will operate as a subsidiary of Marquette.

Waugh Engineering Co. has become affiliated with **Foxboro Co.**, and is operating as the Waugh Engineering Div. of the Foxboro, Mass., firm. Waugh has moved into expanded facilities at 7740 Lemona Ave., Van Nuys, Calif.

Miniature Instruments Inc., Minneapolis, acquired **Metalmasters**, that city, specialist in high precision machining.

ASSOCIATIONS

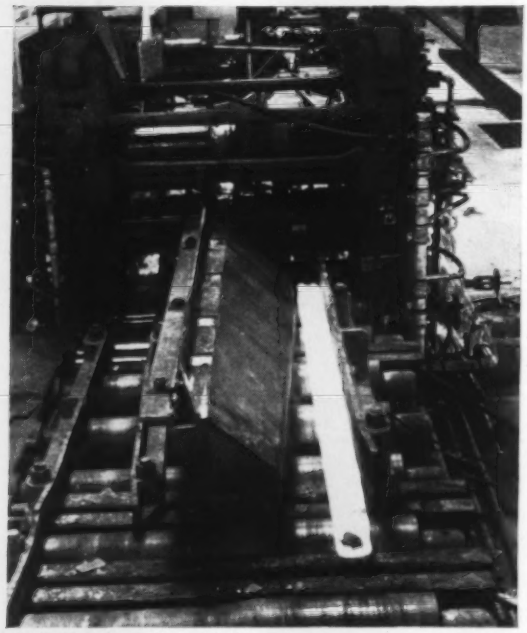
Instrument Society of America, Pittsburgh, elected these officers: President, P. A. Sprague, Hays Corp., Michigan City, Ind.; president-elect-secretary, Nathan Cohn, Leeds & Northrup Co., Philadelphia; vice president-elect of ISA's Standards & Practices Dept., J. R. Mahoney, Oak Ridge, Tenn., Union Carbide Corp.; and vice president-elect of the Technical Dept., Dr. B. W. Thomas, Texas Butadiene & Chemical Corp., Baytown, Tex. District vice presidents include: A. R. Parsons, Westfield, N. Y., Minneapolis-Honeywell Regulator Co.; H. J. Bowman, Aiken, S. C., E. I. du Pont de Nemours & Co. Inc.; C. H. Callier, Dayton, Ohio, National Cash Register Co.; J. Howard Park III, Houston, Maintenance Engineering Corp.; E. See Day Jr., Richland, Wash., General Electric Co.; and A. E. Lee, Menlo Park, Calif., Stanford Research Institute.

Alaska Steel Contractors & Erectors Association has been organized in Anchorage, Alaska. Officers are: President, J. H. Doane, Western Construction Co.; vice president, Rod Saunders, Northern Ventures Inc.; secretary-treasurer, Melvin Cook, Steel Fabricators Inc.; and chairman of the executive board, Andy Milner, Taft Structurals Inc.

Beginning Oct. 9, all the activities of **Bituminous Coal Research Inc.** will be consolidated in the research center at 350 Hochberg Rd., Monroeville, Pa.

New **BIRDSBORO** mill breaks the "billet barrier"

rolls bars directly from ingots



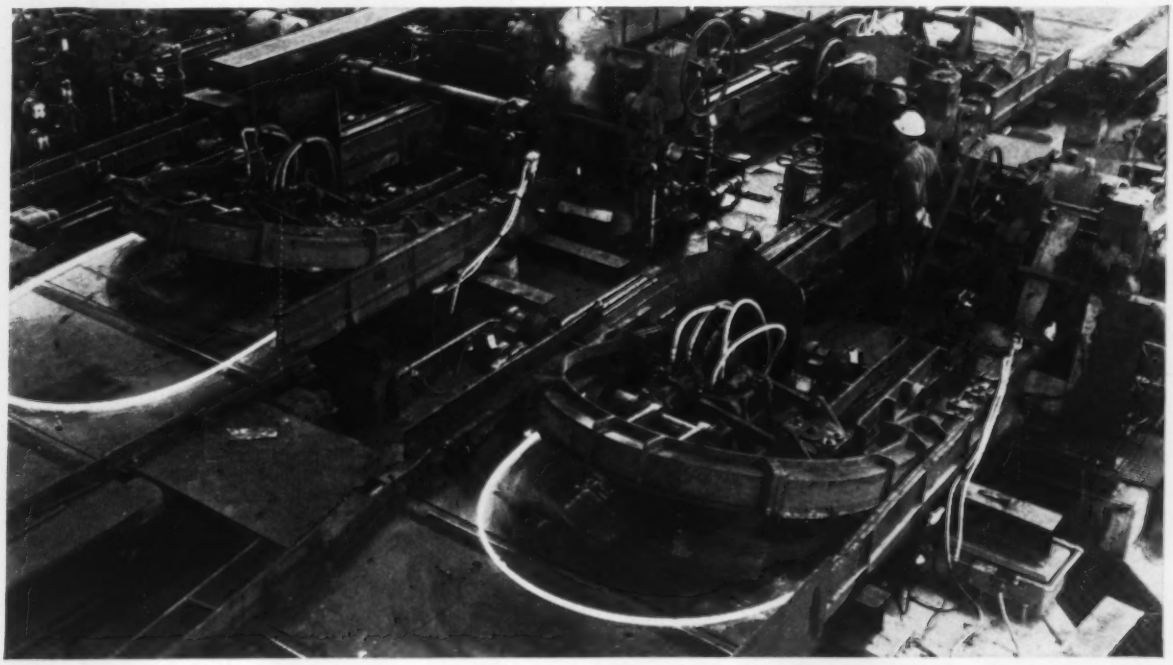
Ingot enters final pass in roughing stand

■ Bypassing the billet stage—a long-sought metal-working goal—has recently been accomplished by the Ceco Steel Products Corporation. From electric steel ingots cast billet-size, Ceco *direct rolls* finished bars on their new Birdsboro rolling mill.

The unique ingots are cast in three sizes, ranging from 322 to 990 lbs. The largest measures $7\frac{9}{16}''$ x $6\frac{9}{16}''$ x 6′; the smallest 5″ x 4″ x 5′. With these ingot sizes, the versatile Birdsboro mill produces rebars, angles, rounds and flats with a minimum of roll changes.

This 14-stand mill, the first of its kind, opens new areas of economy for many manufacturers. If you are considering new bar capacity in a plant of limited capacity, you may well be one of them. Why not call your Birdsboro representative and see? *Sales Department, Engineering Department & Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

Reinforcing bar whips through repeaters



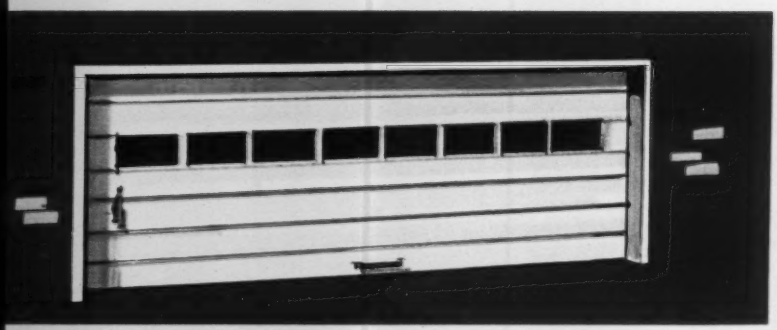
MM96-60

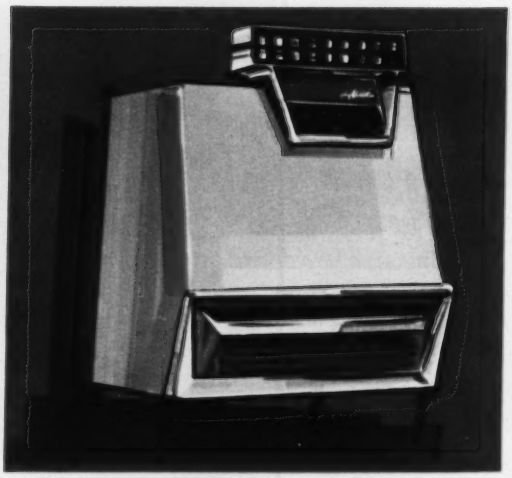
BIRDSBORO

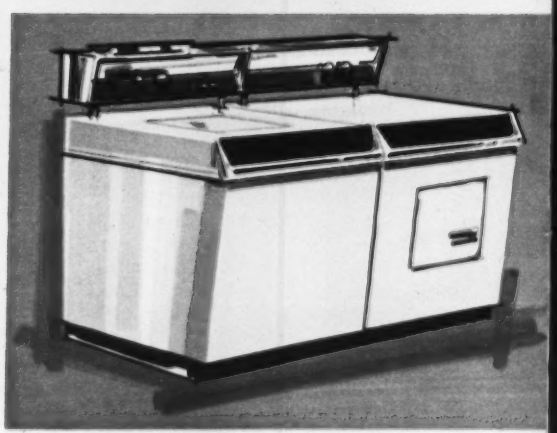
CORPORATION BIRDSBORO, PENNA.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

TWO NEW SPANGLE-FREE ARMCO ZINC-COATED CAN GIVE YOUR PRODUCTS STYLE AND







New steels are born at Armco

STEELS STAMINA

Armco ZINCGRIP A — and ZINCGRIP A, PAINTGRIP offer excellent surfaces for painting, unbroken protection from rust, faster spot welding.

Spangle-free surfaces on new Armco ZINCGRIP® A and ZINCGRIP A, PAINTGRIP® permit finishes rivaling those on cold-rolled steel. ZINCGRIP A requires pre-treatment for painting, but ZINCGRIP A, PAINTGRIP comes with a mill-applied paint-holding surface that takes paint immediately and holds it longer.

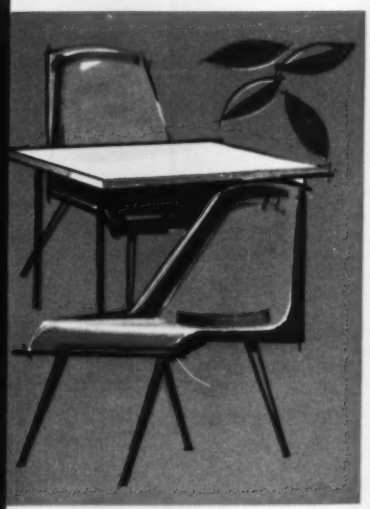
Severe fabrication won't cause their coatings to flake or peel. They're as workable as Armco ZINCGRIP Steel, the **original** continuous hot-dip zinc-coated steel.

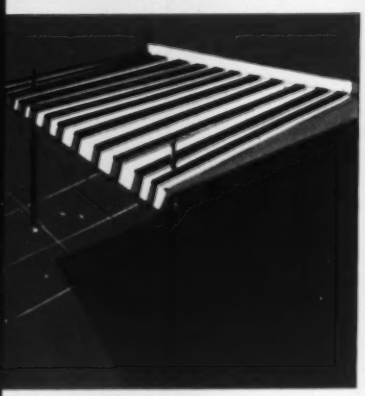
Spot welding goes easier, too. Twice as many spot welds can be made before electrode tips need redressing as with regular galvanized steels.

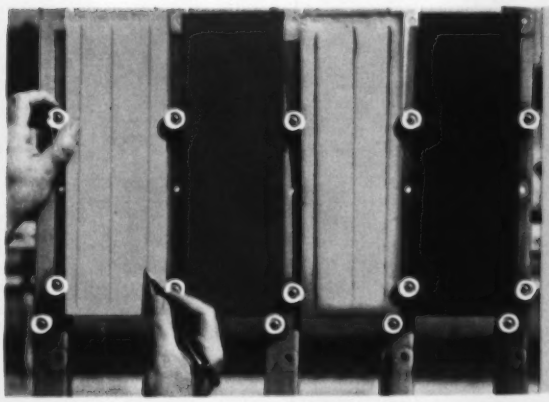
Coils and cut lengths of these spangle-free grades are available in gages from 16 through 24, depending on width, in widths up to 48 inches, depending on gage. Mail the coupon for details.

Galvanized Steel

Put this symbol of strength, durability and economy on the products you sell.







The first two samples are painted and unpainted Armco ZINCGRIP A, PAINTGRIP; the third and fourth are cold-rolled steel treated for painting. All were exposed 3 years in Armco's corrosion testing yard. Note absence of rust on the ZINCGRIP A, PAINTGRIP. Even paint on the cold-rolled steel did not ward off corrosion.

Sample at left is cold-rolled steel, surface-treated for painting; sample at right is ZINCGRIP A, PAINTGRIP. Top half of each is painted. There's little to choose in appearance, yet ZINCGRIP A, PAINTGRIP offers lasting protection.

Armco Division, Armco Steel Corporation
2101 Curtis Street, Middletown, Ohio

Please send me your product data bulletin on Armco ZINCGRIP A and ZINCGRIP A, PAINTGRIP.

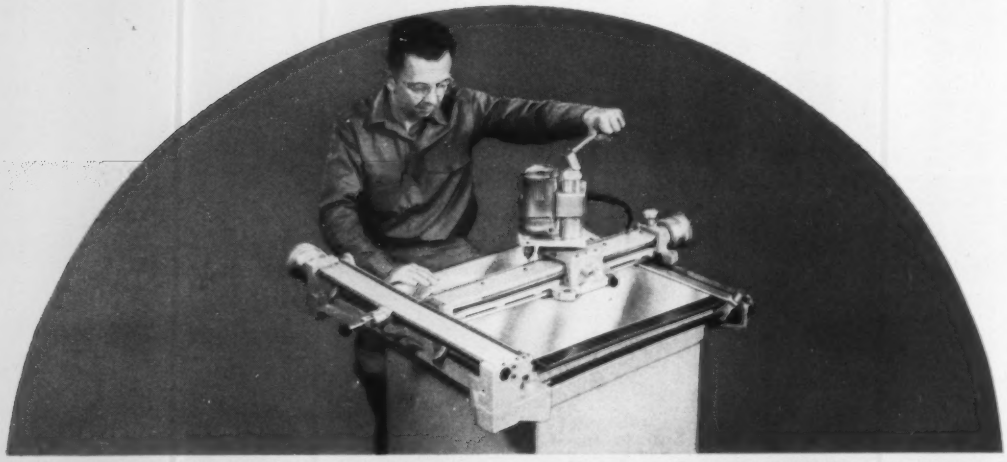
Name_____

Firm_____

Street_____

City_____ Zone_____ State_____

ARMCO Armco Division



STRIPPIT FLEX-O-DRILL CUTS TIME IN HALF

STRIPPIT Flex-O-Drill Drilling-Layout machine offers you low cost, quality equipment that drills, reams, center punches and scribes within ± .002″ accuracy. Designed for template layout and drilling, it's also ideally suited for pilot runs and short run production. A new, inexpensive accessory utilizing a high quality optical instrument converts the Flex-O-Drill to an accurate machine for checking drawings, patterns, templates or production pieces.

STRIPPIT Flex-O-Drill permits you to work directly from a chart of *x* and *y* coordinates... no need to make base line drawings. Adjustable steel tapes quickly set up coarse dimensions. Quick-set Micrometric Gages provide fast, accurate adjustment to thousandths. Result... template making time slashed as much as 50% or more.

STRIPPIT Flex-O-Drill can be operated by anyone with only a few minutes of study. Let our STRIPPIT Tool & Methods Engineer explain the finer points of the Flex-O-Drill and demonstrate it in your plant. Or write for catalog FD.

WALES **STRIPPIT** INC.

A UNIT OF HOUDAILLE INDUSTRIES, INC.

210 Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario

In Continental Europe: Raskin, S. A., Lausanne, Switzerland *In the British Isles: Kearney & Trecker—C. V. A. Ltd., Hove, Sussex, England*

ELECTRODE AGREEMENT—World-wide agreements on the use and sale of platinized titanium electrodes have been reached by several firms. Engelhard Industries Inc., Newark, N. J., is licensee in the U. S., Canada, and Mexico for the electrodes which are said to offer greater benefits than conventional materials in industrial electrolytic cells. Performance is practically identical to that of pure platinum.

STAINLESS BEER BARREL—Benson Mfg. Co., Kansas City, is making a stainless steel beer barrel that costs twice as much as other metal containers but has twice the expected life—perhaps 25 years. Another advantage: No pitch lining is needed. (The stainless is supplied by Allegheny Ludlum Steel Corp., Pittsburgh.)

IMPROVES ALUMINUM EXTRUSION—Wide, flat, thin profile aluminum extrusions can be produced better with a rectangular extrusion container than with the conventional round shape, says the Air Force. Details are in reports PB 171,568-1, -2, Office of Technical Services, Department of Commerce, Washington.

TRANSISTORIZED TV—"It will not be long before industry will reduce costs of transistorized TV sets . . . so they can be mass produced," says Japan's *Nomura News Letter*. Sony, Toshiba, and Matsushita are making luxury models. The cost bogdown: The thermoelement.

LIFT STEEL SPECS— Committee A-1 on Steel is considering the withdrawal of specification A-8 for structural nickel steel, says the American Society for Testing Materials, Philadelphia. Reason: Little or none is being produced.

VERSATILE MAGNET MATERIAL—The latest development in magnetic alloys of the cobalt-platinum system (Platinax II) is said to be one of the most powerful permanent magnet materials known. It can be machined, rolled, or drawn, and it lends itself well to the manufacture of magnets which would otherwise be impractical because of their complex shapes or smallness, claims R. A. Mintern, Johnson & Matthey Ltd., Hatton Garden, London, England.

NEW USES FOR CABLES— Surplus electrical power will soon be transferred between England and France by a lead sheathed cable which will be installed late this year, says the Lead Development Association, London. A similar multiple-layer "cable" (without wires) will transmit fuel gas from British Columbia to Vancouver Island in Western Canada.

NEEDED: BETTER PORES—Porous tungsten shapes are excellent in ion engines for space applications, says National Aeronautics & Space Administration. Still needed: Ways to mass produce shapes with pores that measure less than 1 micron; methods of sintering which won't close the pores; methods of joining porous tungsten to other refractory metals or ceramic insulators to form gastight seals effective at 2000° F.

NYLON ADVANCES—Recent technical developments have shown that nylon can be synthesized at room temperature. Significance, says Battelle Memorial Institute, Columbus, Ohio: It may be possible to make the material more heat resistant; to make its molecules larger (which increases resistance to impact and improves molding properties); and to produce several tons a minute (versus 100 lb batches in 4 to 5 hours now).

IMPROVES COPPER SINTERS—By adding aluminum, silicon, or magnesium oxide powder to copper sinters you can increase strength 50 per cent, hardness 100 to 200 per cent at temperatures between 68 and 1400° F. With 1 to 3 volume per cent aluminum oxide, conductivity is 87 to 93 per cent that of pure copper, oxidation resistance is higher. Observations were made by the Russians, reported by the National Aeronautics & Space Administration, Washington, in a technical translation (F-64).

Optical extensions enable operator to observe and control melting in 900,000 watt electron beam furnace. Temescal can make ingots 20 in. in diameter

Vacuum Processes Set for Boom

• **"FUTURE achievements in metallurgy will depend on our ability to understand and control imperfections," says Dr. Robert Ulrech, director of engineering, Consolidated Vacuum Corp., Rochester, N. Y.**

Topflight metals people concur: They say that a large part of our future success in handling such imperfections will depend on our skill in vacuum technology.

What about now? The benefits of the technology developed so far are getting easier to come by, the techniques more readily available to the average metalworking shop. Here are a few:

• Vacuum melted metals (including their carbides and borides) are cleaner, contain far less gas, and are generally stronger and perform better than their air melted counterparts. They are subject to fewer inclusions, cavities, or shrinkages.

• Parts heat treated in a vacuum aren't as distorted or as decarburized, often look brighter than metals treated by other methods.

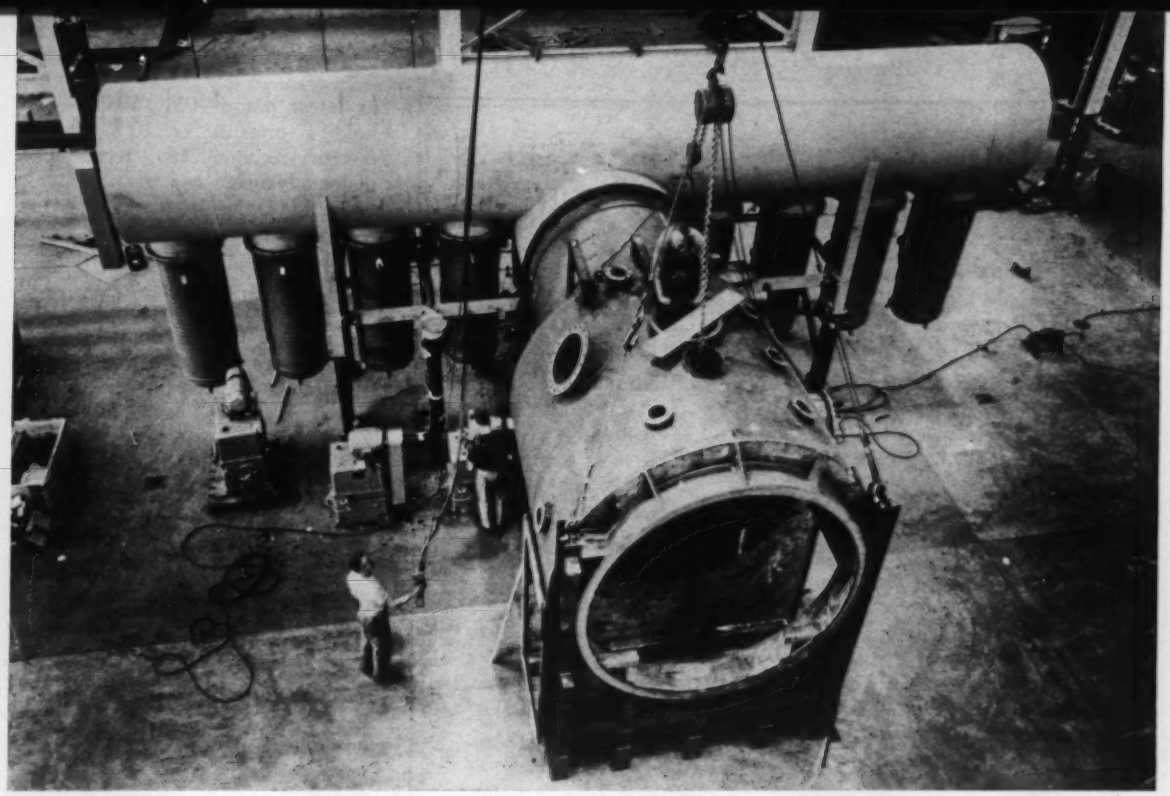
• Aircraft vacuum brazing (for example, honeycomb) cuts costs; results are said to be superior to those obtained in atmospheres.

In addition, tremendous strides are being made with ultrathin coatings of metals on plastics, ceramics, and metal substrates. Electronics firms can make lighter, smaller condensers and resistors with "see through" metal films on plastic. High performance parts are coated with cadmium without danger of hydrogen embrittlement. In some instances, tin and aluminum can be applied continuously to sheet steel at costs lower than those of conventional tin plating.

• **Vacuums for improving metals are pressures below 1 micron (10^{-3} mm of mercury) or about 1 millionth of an atmosphere.**

Such rarified environments solve these problems:

1. Degassing—Melting, sintering, or annealing metals in a vacuum removes gases trapped in grain boundaries as oxides, hydrides, or



Unusually large, induction melting furnace holds 4000 lb heats, operates on large volume basis at 1 micron, says Stokes. It will produce jet engine alloys

nitrides, in solution in metal lattices, or trapped as blowholes.

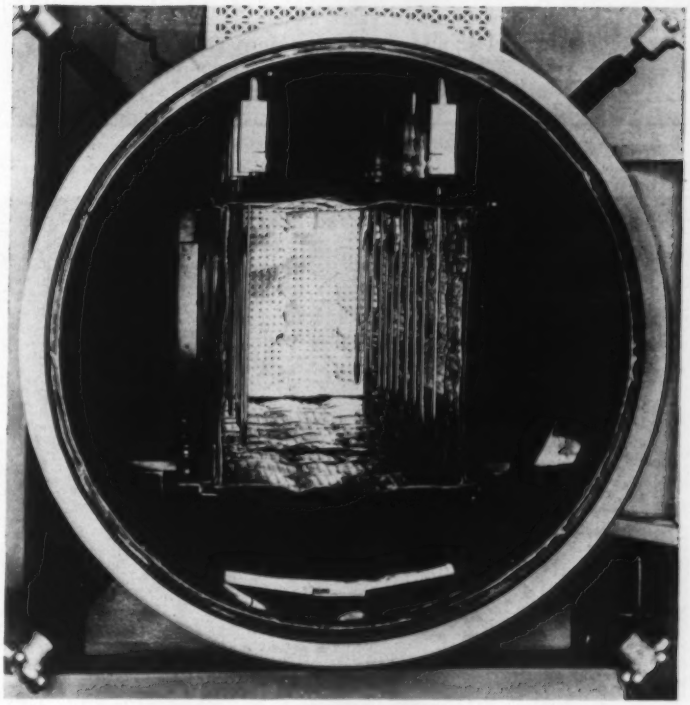
2. Eliminating gas reactions—Extremely low pressures cut interaction of gas and metal molecules.

3. Changing chemical equilibriums—Vacuums operate on a principle called the Law of Mass Action to unbalance pressures.

4. Refining—Because of the high temperatures in vacuum (in an arc furnace that reaches 8500° F), you can fractionate or sublimate metal impurities.

• Principal beneficiaries of vacuum refined metals are builders of nuclear reactors, aircraft and missile makers, electronic manufacturers, shipbuilders, and automakers, say equipment producers. Increasingly large installations are bringing costs down, spreading availability to the average user, they assert.

One of the most common ways of vacuum refining metals involves a consumable electrode. Air melted metal is cast into a long bar or electrode and mounted in a tall furnace which produces an arc at one end in a 5 to 50 micron vacuum. (Consolidated Vacuum Corp. says



Cold wall, resistance furnaces like this can heat treat at 5000° F. Operating ease is credited for its popularity

How Vacuum Experts See Future

VISUALIZE the steel mill of tomorrow: Alloy metal streams from an electric furnace and moves continuously through a vacuum stream degasser; a consumable electrode, vacuum arc furnace; finally, through an electron beam vacuum furnace.

Costs: About what they are today for premium steel. But quality and physical properties will be at "unusual" levels—impurities only a few parts per million, run-of-the-mill physical properties could be 20 per cent higher than our best commercial efforts today.

That's the picture painted by Dr. Charles d'A. Hunt, vice president, Temescal Metallurgical Corp. Here's what his opinion is based on:

A 900,000 watt power supply (almost ready) for the firm's present furnace will enable it to produce a 20 in. ingot of low alloy, carbon steel, 6 ft long. The experience already gained from Temescal's present furnace has enabled the firm to prepare acceptable feasibility studies for "several" steel firms.

In one, a 5 million watt furnace is shown capable of producing 12,000 tons of alloy steel annually at costs which will be competitive with the best consumable arc furnaces today.

Two other studies involve furnaces requiring 15 million and 1500 million watt inputs.

• **Heat Treating**—This prediction is made by John Durant, manager, Standard Products Div. of Vacuum Specialties Inc.:

"The few hundred melting furnaces currently in use are being outnumbered by vacuum heat treating furnaces. We estimate that within five years metalworking plants will be operating tens of thousands of such furnaces."

its latest pump—PMC-50,000—can hold a pressure of 10^{-5} mm of mercury economically, terms it a major advance.

As the arc melts its way up the electrode, the molten metal drops a short distance into a continuous mold (water cooled copper). On the way and until it solidifies, the metal is cleaned by the vacuum.

Most recent example: A furnace at Midvale-Heppenstall Co., Philadelphia, can produce a 40 ton ingot, 5 ft in diameter.

Another reason for the trend to large ingots: Demand for bigger forgings by makers of aircraft and nuclear reactors. (See STEEL, Sept. 11, p. 102.)

Another important method: Vacuum induction. (For a complete list, see STEEL, Feb. 6, p. 70.)

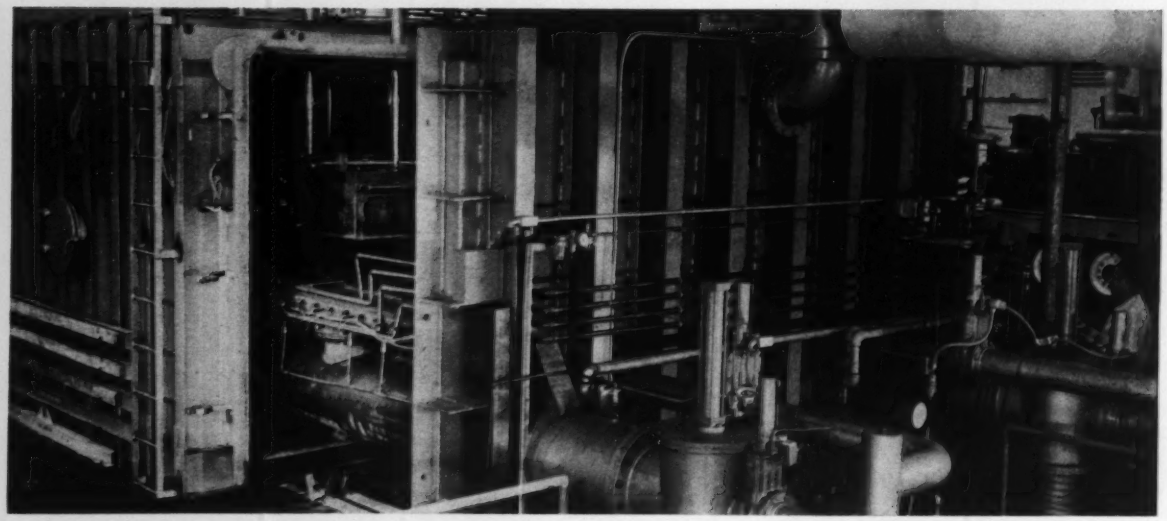
• **The electron beam appears to have significant possibilities for users. Impurities are measured in parts per million.**

An unusually large unit at Temescal Metallurgical Corp., Berkeley, Calif., provides a proving ground for theory. A beam of electrons focused on the end of an "electrode" replaces the arc, melting the metal into a water cooled mold. More molten metal surface is exposed longer.

Principal advantages:

• Metal purity is the highest available commercially.

• Potential cost of refining is said



Outsize Stokes furnace brazes entire honeycomb wing for Grumman planes. Parts are stronger, require no welded envelope. Saving: $40,000 a month in argon gas

to be comparable with or less than that of the consumable electrode method.

Temescal's present furnace melts an 8 in. ingot of tantalum (a difficult metal) with a 600,000 watt power supply. The firm is building a still larger unit.

• Vacuum heat treatments include annealing, degassing, hardening, homogenizing, sintering, tempering, brazing, diffusion bonding, and soldering, says John Durant, manager, Standard Products Div., Somerville, Mass., Vacuum Specialties Inc., a subsidiary of Geophysics Corp. of America.

He lists these advantages:

- Parts have improved corrosion and fatigue resistance, as well as higher impact strength.
- The vacuum permits employment of temperatures to 5000° F.
- Heat treated parts are more uniform, surfaces are brighter.
- Vacuum treatment imposes the least interference with basic properties of metals. (An example: Stainless with a carefully adjusted boron content is not deboronized.)

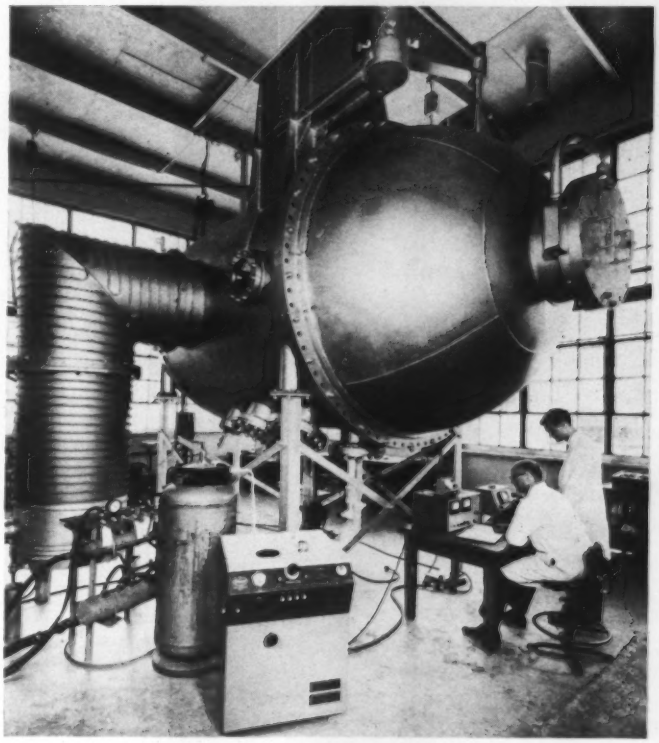
Most equipment builders say that the cold wall, vacuum furnace is most popular, offers greatest possibilities. Such furnaces can be built as big as you want.

A series of concentric, sheet metal shields (often made of refractory metals or stainless) just inside the vessel wall shields the intense heat produced by refractory metal heating elements.

Brazed joints made in such furnaces are free from inclusions because initial heating outgasses the metal surfaces.

• Vacuum processing often permits salvage of parts. A Midwest auto partmaker uses one for work which requires heats from 600 to 2200° F.

The firm produced some intricate stainless steel shafts. After heat treatment in a regular atmosphere furnace, it was found that the shafts had warped slightly. The buyer suggested scrapping since further treatment would endanger composition. But the shafts were annealed and rehardened in a special fixture in a vacuum furnace. Saving: $18,000. It went a long way toward paying off the $25,000 investment, states C. I. Hayes Inc., Cranston, R. I.



How to Bring Space Down to Earth

VACUUM chambers like this one for environmental testing are important to our space program. It can simulate conditions 800,000 ft above the earth.

This chamber checks leaks in large heat sink panels for Grumman Aircraft Engineering Corp., and tests a full scale Orbiting Astronomical Observatory (OAO).

The chamber was built and installed at the Chicago plant of Chicago Bridge & Iron Co. It's 8 ft in diameter and 18 ft long. One end can be swung open to accommodate large pieces.

Many similar vessels are already employed in environmental testing. Several as big as a barn will accept full scale missiles.

• Leads to Bigger Things—Apparently there's no size limit in the thinking of vacuum equipment producers. Universal Cyclops Steel Corp., Bridgeville, Pa., is seriously considering a whole fabrication plant entirely in a vacuum. Called Vac-Fab, maximum impurity of the atmosphere in which refractory metals will be prepared will be 1 part per billion compared with the present level of 50 parts per million at its InFab plant (STEEL, May 8, p. 128).

• Another Use—The Vacuum Furnace Div., Richard D. Brew & Co. Inc., Concord, N. H., notes growing activity in the field of high temperature materials. Some are being tested at extremely high temperatures in vacuum. The units measure and record short time tensile and creep rupture values.

Consistent, high product quality is a benefit of variable speed capability on this four high, cold rolling unit. It's made by Finn B. Abramsen Co., Pittsburgh

How to

• THE LAST ten years have indicated a definite trend to adjustable speed drives that makes correct selection among the different types more important than ever, says the Direct Current Motor & Generator Dept., Erie, Pa., General Electric Co.

The company adds that users have found that a relatively small extra investment for adjustable speed is more than justified by the greatly increased return in machine efficiency and versatility. To aid in the difficult, sometimes confusing, job of drive selection, STEEL presents the high points from GE's new brochure on adjustable speed drives.

• As the first step in selection, says the company, you should analyze

Advantages of Adjustable Speed Drives

• **Increased Production**—Machines are enabled to do each job at the speed best suited to the work, machine, and skill of the operator. Often batch processes can be handled on a continuous basis. Adjustable speed drives are suitable for continuous processing and they lend themselves to use with a variety of sensing devices. Result:

Select Adjustable Speed Drives

and establish the functional requirements of the drive. They are probably the most important, says GE, and include such things as speed range, the driven machine load characteristics, and accelerating requirements.

Both present and future requirements of the driven machine should be considered. Be careful about specifying functions. You may find that you can simplify the drive and reduce initial and maintenance costs. For example: Consider the braking function. Initially, rapid stop may be a requirement for the drive and dynamic braking may be specified. But if the driven machine inherently has largely a friction load, the normal coast-stop might be fast enough for the application.

• In establishing functional requirements, GE says the following areas should be considered:

• **Horsepower and Speed** — What horsepower is required at what top speed? The most common speed for adjustable speed drives in the 1 to 200 hp range is 1750 rpm. Drives are available with output speeds from 10 to 4000 rpm. Generally, the price goes up as speed goes down.

• **Speed Range**—In addition to top speed, what is the minimum requirement? Usually, the price increases with the speed range. Ranges from 2:1 to more than 200:1 are available.

• **Speed Torque Characteristic of the Load**—To select the drive rating that will supply the power requirement of the load, find the torque requirement at all speeds of the driven machine.

Most applications have constant torque loads (typical of machines where the load is primarily friction, as in conveyors). When selecting a drive for constant torque loads, the load horsepower requirement at maximum speed and the drive rating are the same (assuming the proper selection of gear ratio).

Some applications, such as machine tools and drives for reeling strip at constant tension, may require constant horsepower over a given speed range. In applying a constant torque drive to a constant horsepower load, the required drive rating is equal to the load horse-

they are intimately associated with process automation.

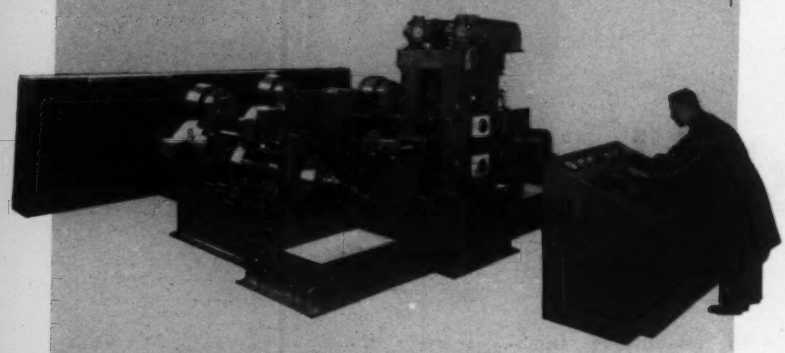
• **Greater Machine Versatility**—Precise control of machine speeds permits users to quickly adapt production setups to economic and technological changes.

• **Improved Product Quality**—Speed control, often the most critical process variable, is practically synonymous with quality control. The ability to accurately control speed allows significant reductions in spoilage, rejects, and tool breakage. Flexible speed control also saves material by maintaining closer tolerances in operations like cutting, slitting, shearing, and coating.

• **Simpler Operation**—Many industrial machines or processes can be divorced from operator's skill. In addition, adjustable speed drives permit attaining desired speed smoothly, holding speed when load changes, quick stopping, jogging or creeping at preset low speeds, stopping and restarting without changes in the speed dial setting, and protecting machines against excessive torque.

• **Space Saved, Maintenance Reduced**—The driving unit (located at the driven machine) used with most adjustable speed drives is generally no larger than one required for a constant speed drive. Packaged adjustable speed drives provide all necessary drive components in three convenient building blocks. They include the drive unit at the driven machine, the power unit (or control) which can be located conveniently.

• **Modernization**—By installing an appropriate adjustable speed drive in place of constant speed motors, it may be possible to convert some machines into modern, multipurpose units. On new machinery, it is recommended that you specify drives that will meet future production needs.



Size of electrical drive apparatus on this strip rolling mill is only half that previously required. The unit is at Waterbury Farrel Foundry & Machine Co., Cheshire, Conn.

Besides stepless speed control, adjustable speed drives can be set up to provide many of these functions:

1. Remote control.
2. Presetting of drive speed.
3. Maintenance of speed under loads.
4. Control rate of acceleration to a preset speed.
5. Current limit acceleration (controls rate of acceleration and maximum torque for protection of drive and driven machine).
6. Preset jog and thread speeds.
7. Dynamic braking.
8. Quick slowdown.
9. Regeneration.
10. Reversing.
11. Protection against such things as undervoltage, overvoltage, field loss, and short circuits.

power times the load-speed range required. An adjustable speed drive using a dc driving motor is capable of constant horsepower output without derating because of the inherent motor characteristic when operated in the field weakening range. However, GE also points out that such an arrangement may not always be lowest in price. An inexpensive, but oversized, constant torque drive (for example, an eddy current type) may cost less.

Fans, pumps, and other machines require varying torque. If a constant torque drive is selected for top speed, the drive will be more than large enough to supply the load requirements. Because all machines generate some friction, the load requirement is rarely exactly constant horsepower; neither are fan and pump loads exactly cube functions of speed. Friction tends to shift the load curve toward a constant torque characteristic.

Varying torque loads may also require torque in excess of what's available from a constant torque drive at reduced speed. The more accurately the true load speed torque requirements can be determined, the more economically the drive equipment can be selected.

• **Reliability and Maintenance** — Evaluate the various drive features and components which may influence the drive's reliability and the amount of maintenance required under the circumstances in which it is applied.

Check the reports on reliability and maintenance of different types of adjustable speed drives. Apparent differences are often occasioned by the capability and experience of maintenance men. Example: Maintenance people with experience in servicing dc motors, generators, and associated control equipment will consider their reliability better and maintenance less than for an unfamiliar type of equipment using electronic tubes.

Similarly, a user may find it simpler and less expensive to change a belt on a mechanical, adjustable speed drive than to test and replace a tube on an electronic drive.

• **Operating Efficiency and Power Factor**—For most adjustable speed drive applications under 50 hp, the efficiency and power factor of the drive are not important. Power losses, or total power requirements, are generally not significant factors in product costs.

Sometimes a user's power contract with a utility may impose a severe penalty for power factors other than unity, thereby influencing the selection of a drive. The power factor of the drives can be improved.

• **Size and Weight**—The smaller, lighter types are particularly advantageous where mounting space is at a premium and where the units are mounted on the driven machine.

• **Cost**—Cost is always an important consideration, but only after functional requirements have been met. The factors of efficiency, reliability, maintenance, size, and weight may well be considered before cost for some applications.

Diversification...

IN SOAKING PIT CONSTRUCTION

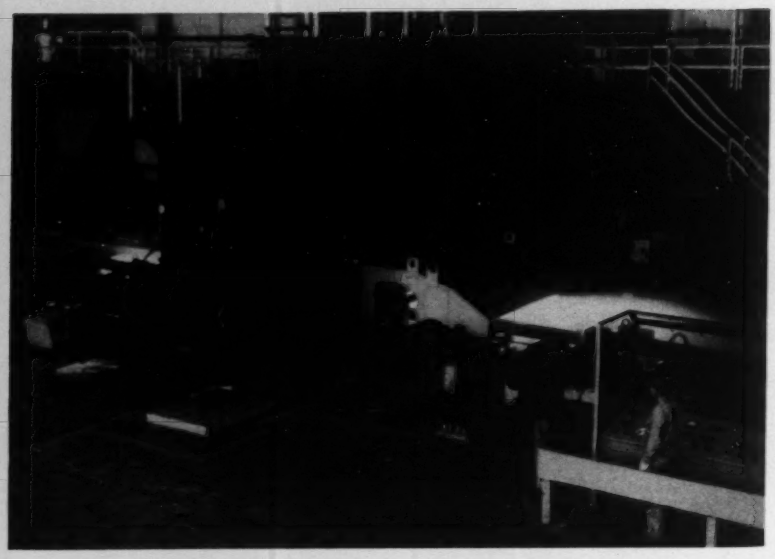
Illustrated are five one-way fired soaking pits with metallic recuperators installed recently at the Buffalo Works of Republic Steel Corporation. Amsler Morton Company now ranks as the most diversified builder of such equipment having constructed pits with virtually all types of recuperators.

AMSLER MORTON CO.

MANOR BUILDING • PITTSBURGH 19, PA.

a extron company

In Canada: AMCO Furnace Contractors Ltd., Toronto, Ontario



New rougher makes first passes on hot slabs . . .

Coilers for the hot strip mill are bigger

Rebuild Boosts Coil Size, Increases Monthly Output

• **"MODERNIZATION of our 56 in. hot strip mill makes possible the production of larger coils to satisfy present day customer needs," says C. Thompson Stott, general manager at the Sparrows Point (Md.) plant of Bethlehem Steel Co. Greater operating economy is also cited.**

The mill, which was returned to full scale operation earlier this year, is turning out coils that weigh up to 500 lb per foot of width. Maximum coil size before the modernization: 250 lb per foot of width.

• **Rolling capacity has been boosted from 175,000 to 210,000 tons a month.**

Included in the mill rework: Installation of three, new, 200 ton per hour, slab heating furnaces to replace four, 110 ton per hour units; a new, two high, roughing mill; three, new, rotating mandrel coilers; new coil conveying facilities; and new auxiliary buildings and equipment.

Slabs 23 ft long, 7½ in. thick, and 14 to 48 in. wide are inspected and conditioned, then heated to rolling temperature (about 2300° F) before they are sent through the scale breaker and into the five stand, roughing train. The roughing stands reduce thickness from 7½ to ¾ in. After end cropping, the steel passes through a second scale breaker and six finishing stands.

• **Strip thickness and width are measured by on-line, noncontact gages.**

As the strip leaves the final finishing stand, thickness is measured by an x-ray gage. The beam of the gage, below the strip, is directed upward. Intensity of the rays, measured by a photoelectric device mounted above the strip, is translated into a thickness value.

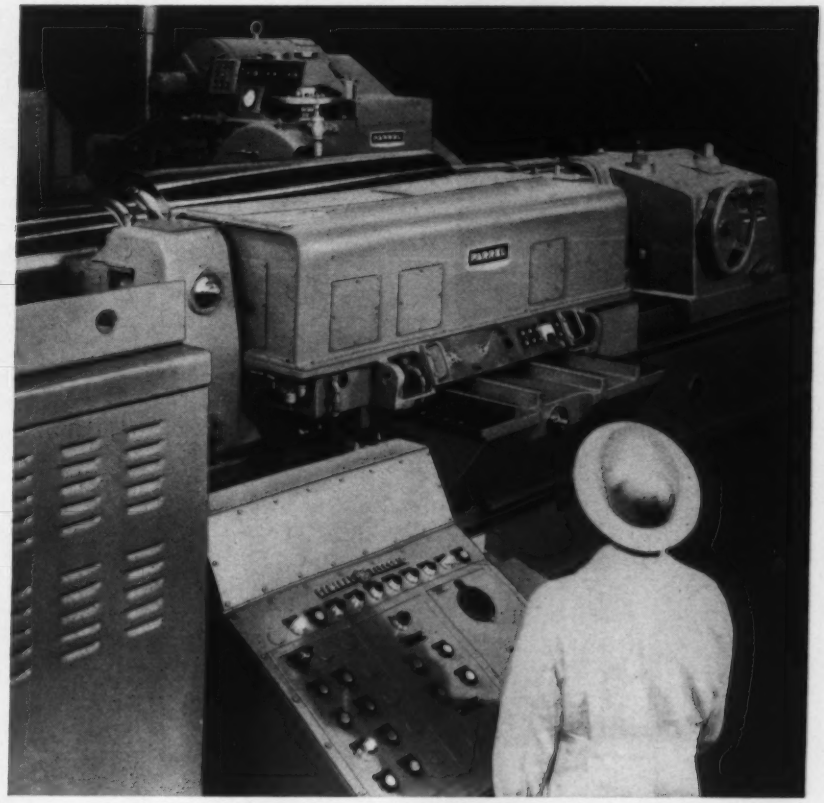
Width of the strip is controlled with an infrared radiation device to a plus or minus ⅛ in. accuracy.

• **Intermittent operation during the modernization prevented long production recesses or loss of orders for coils from the 56 in. mill.**

The mill was operated off and on instead of being shut down completely during the rebuild. (The revamp required a total of 20 months.)

Most alterations were made at the ends of the mill; existing furnaces and coilers remained in service until new ones were ready for use.

Roughing stands remained in use throughout the modernization. Two mill housings that had been in storage at the company's Lackawanna (N. Y.) plant were taken to Sparrows Point and used in the line alternately while existing housings were remachined and reset. The new stand was then left in the mill as part of the roughing train.



View of Farrel 60" heavy-duty, fully automated roll grinder, showing control console in foreground and probe table beyond.

NOW

your roll grinding can be AUTOMATED

(completely or partially)

Previously developed to the point where it could be set to accurately perform each of its functions, without manipulation by the operator, Farrel's heavy-duty roll grinder can now be fully automated. This brings a new dimension to roll grinding control and permits mill management to fix and maintain definite standards of regrind procedures.

Operating from standard one-inch tape, the automatic control will direct the grinder through a complete cycle, performing all operations necessary to refinish a roll. Thus the operator's responsibility is reduced to loading and unloading of the roll.

Accuracy of roll diameter and crown are automatically controlled, too, assuring minimum stock removal . . . longer roll life. The machine will also match exactly the diameters of paired mill-stand rolls, regardless of uneven wear.

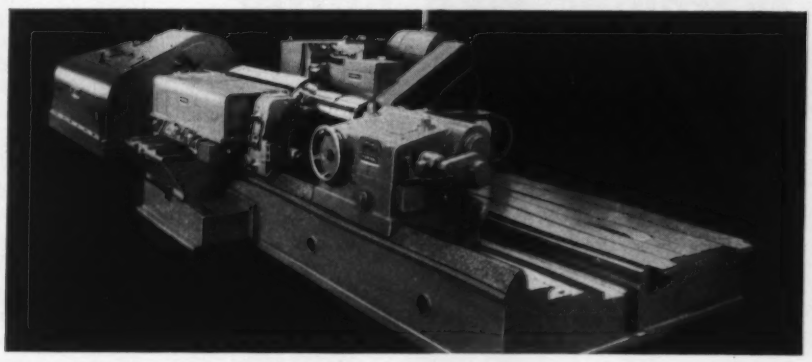
Where *complete* automation is not needed, automatic control of individual machine functions can be provided. In short, the degree of automation delivered is dictated by individual requirements.

A Farrel engineer will be glad to discuss how tape-controlled roll grinding can improve your production method. Write or call today.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Akron, Chicago, Los Angeles, Houston, Atlanta
European Office: Piazza della Republica 32, Milano, Italy

FARREL



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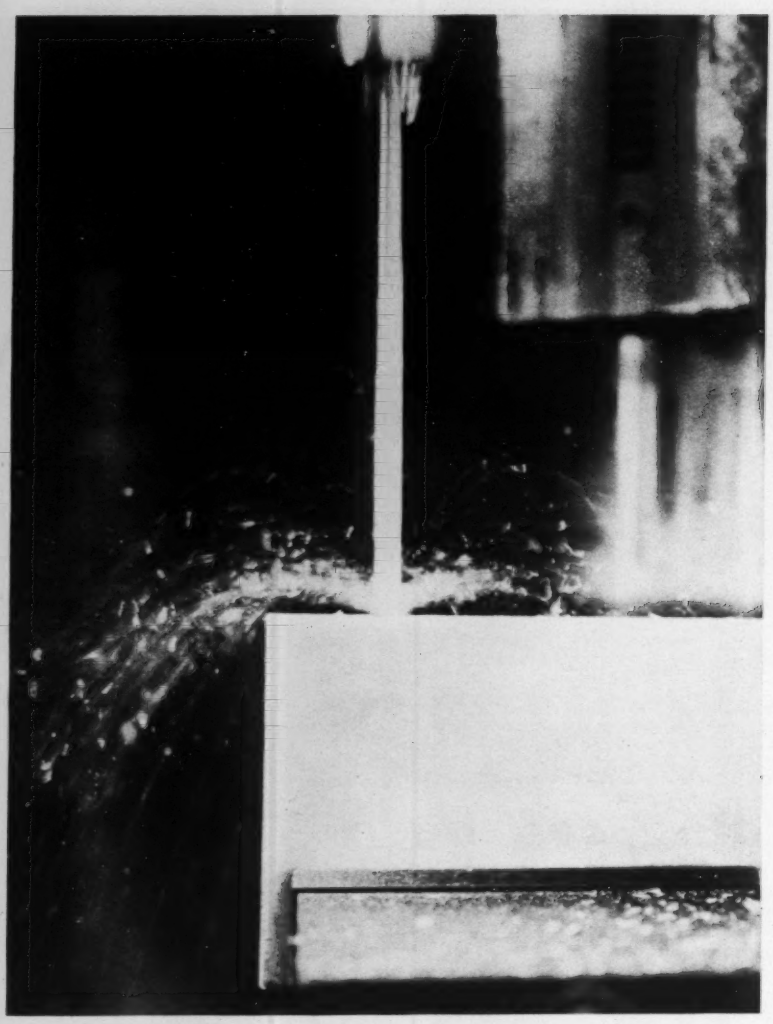


Test with 3/8 in. drill at 40 ipm shows . . .

New Aluminum Alloy 'Machines Like Butter'

MACHINING characteristics of a new aluminum casting alloy are termed "vastly improved" over previous types by the developer, Aluminum Co. of America, Pittsburgh.

Metallurgists at the firm's Cleveland research laboratories say the new alloy can be machined at exceptionally high speeds without cutting fluid, a feat said to be impossible for existing casting alloys. In addition, they say the metal can be cut with lubricants at machining speeds far in excess of those employed with conventional casting compositions.

"It machines like butter," one metallurgist comments.

Alcoa officials say they have only tried drilling (shown above) and milling in comparison with a well-known established cast alloy. At speeds at which the new alloy responded well, the conventional alloy slowed and jammed cutters and drills, loading the cutting edges heavily. A milling cut in the new alloy, although heavy, left a "beautifully grooved" finish in the test piece.

• **Cites Drilling Results**—An 8 in. long, 3/8 in. diameter hole was drilled in the new alloy with a feed rate of 40 ipm. No cutting fluid was employed. Chips flowed freely through the drill flutes while heat buildup was negligible.

Alcoa officials point out that composition of the alloy is similar to that of 355 and 356.

It is still being evaluated in laboratory tests before being offered commercially.

Silicone Coat Cuts Heat Treat Cost

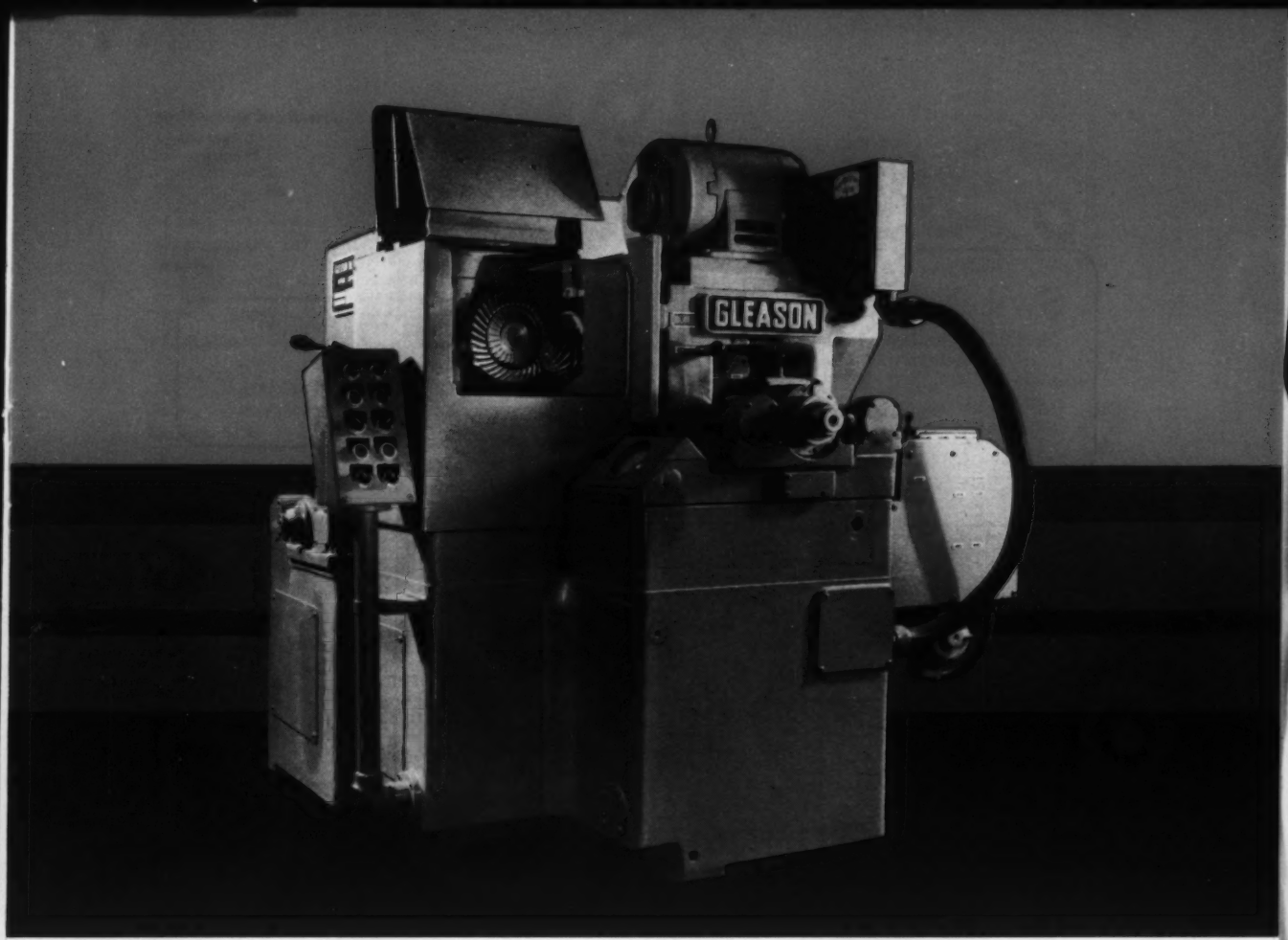
A THIN coating of silicone fluid applied to stainless steel prior to heat treating inhibits the formation of scale.

The result: Metal is saved; less acid is used; production time is cut; and the product is better. The technique is being used at the Boeing Co., Seattle.

Boeing reports that metal loss during one heat treat and descaling operation is kept down to 0.1 or 0.2 mil per surface. Metal loss in three annealings is held to 0.4 to 0.6 mil, and only one descaling operation is required instead of three.

• **Time Savings**—Using Dow Corning 200 fluid as the silicone coating, Boeing engineers have established that subsequent pickling time is usually about one-fifth to one-tenth that required without the coating. The reduction in pickling time also reduces intergranular attack on certain sensitive alloys, and reduced scale formation permits use of a milder pickling solution.

Boeing studies show that $24 worth of fluid coats up to 2000 sq ft of steel. The resultant reduction in scale saves about $150 worth of metal, $10 worth of acid, and $50 to $80 worth of production time.



New "Swing Pinion Cone" concept basic in Gleason No. 503 Hypoid Lapper

SPC is a completely new concept in the lapping of spiral bevel and hypoid gears. With this method, improved refinement of tooth surfaces is obtained, resulting in quieter, smoother-running gears.

SPC is accomplished on the No. 503 Hypoid Lapper by actually pivoting the pinion member in a horizontal plane about a point that is the approximate center of the tooth mesh. This motion, combined with a corresponding horizontal movement of the pinion member during the lapping cycle, moves the contact uniformly over the entire tooth surface to insure complete lapping.

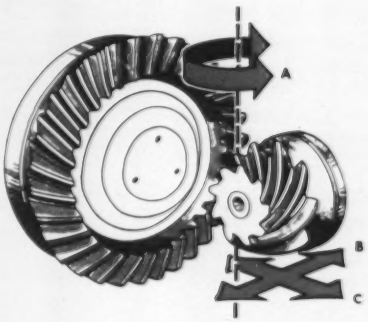
Previously prolonged lapping has been a major problem. However, extended tests have conclusively proved "prolonged lapping" with SPC does not have a major effect on the tooth contact pattern or tooth shape. This feature removes the problem of decreasing the amount of pinion axial adjustment during assembly.

Completely Automatic Cycle. Once the correct lapping cycle is established, all of the motions are completely automatic. Complete control of the lapping cycle, including such features as faster lapping time, independent lap of coast and drive side and proper backlash, are independently set through a convenient "dial-in" system.

Faster Production. An increase of approximately 20% productivity is obtained on the No. 503 Hypoid Lapper employing SPC.

The No. 503 Hypoid Lapper is a high production lapper, intended for automotive or custom gear shops, and accommodates 90° shaft angle gears up to 10" in diameter. The No. 504 Hypoid Lapper, our larger model, will handle gears up to 36" in diameter. Shaft angles on this machine can be extended to a 10°-160° range.

For more information and specifications, please write for technical bulletins.



SPC LAPPING MOTIONS: The swing motion of the pinion head (A) moves the bearing along the length of the tooth. The axial motion of the pinion head (B) moves the bearing up and down the tooth profile, while the motion of the pinion head in the direction of the gear axis (C) maintains constant backlash.

GLEASON WORKS

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92

Switch Control:

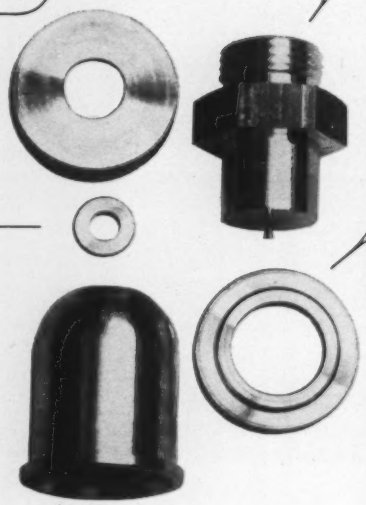
Another Olin alloy change saved the manufacturer about 7% on metal and resulted in higher machine operating speed.

Aircraft Fitting:

Superior surface finish of Olin hexagonal bar eliminated need for secondary finishing operation.

Clock Time Wheel Hub:

An Olin-recommended alloy change resulted in a raw material cost saving of 11%.



Fuel Valve Body:

Olin rod and Olin technical help reduced machining time from 5.5 to 2.4 seconds.

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The high quality of Olin Aluminum improved the surface finish 25%. Reduced machine down time.

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Computers Aid Programing Of Numerical Control

• A FEAR of the complexity and cost of programing has kept some metalworking executives from investing in numerical control, even when it promised to pay off handsomely.

Much of the programing on simple point-to-point systems is really too easy to worry anyone, but on more complex, more versatile systems, and particularly those that do some contouring, programing could be the largest, most tedious, and perhaps the most costly part of the manufacturing sequence. Even though numerical control may beat any competitive system, its programing might seem overwhelming.

But help has arrived—in the form of computers.

• With the advent of computerized programing, it may well be time for the most wary numerical control prospect to take another look.

By taking over the multitude of tedious calculations that must be made to direct a machine through a prescribed, controlled series of motions and functions, computers are slashing the programing time for jobs by as much as 90 per cent. That cuts the programing cost, and the accuracy of the programs is improved.

Remington Rand Univac Div., Sperry Rand Corp., New York, has announced a system for use on the Univac Solid-State 80 and 90 computers. The system was developed jointly by Univac and Rohr Aircraft Corp., Chula Vista, Calif., where it is in regular use. At Rohr, the computer takes only about an hour each day to make all the calculations needed to program nine numerically controlled machine tools.

Dr. Gastone Chingari (left), director of numerical control applications for Univac, and Nils Olesten, numerical control general supervisor for Rohr Aircraft, check program data for a complex hinge fitting. The two companies jointly developed the new computer programing system

• Flexibility of the Univac system makes it applicable to a variety of machines.

At Rohr, the computer is programing a Giddings & Lewis profiler, Morey vertical profilers, Cincinnati skin mills, and a Cincinnati traveling column milling machine. The control systems include a Thompson Ramo Wooldridge, a Cincinnati, an E.C.S., and a Numericord.

The Univac system uses a programer's manuscript, a simple statement of manufacturing information prepared from an engineering drawing. Cards are punched from the manuscript and fed into the computer. The computer then produces a new set of punched cards that are used for machine control.

• Univac users can get the program at no cost. Nonusers can get the programing service at the company's service centers.

The "software" package that sets up the computer as a program calculator will be made available, without cost, to companies using the Univac Solid-State computers. Programs for numerical control will be available at Univac service centers. Manufacturers who don't have computers can get help in programing parts from service centers.

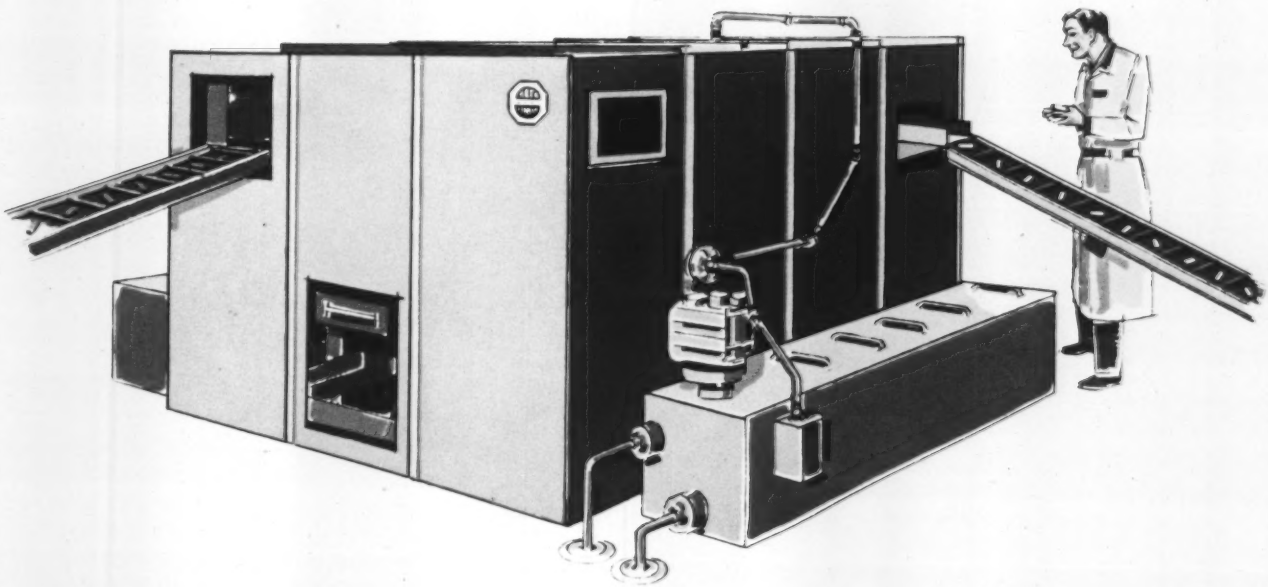
The company also disclosed it is developing an advanced programing system for the new Univac 1107, thin film memory computer. It's to be part of Aerospace Industries Association's APT (Automatically Programed Tool) program.

As for the importance of the computer technique, Dause L. Bibby, president of Remington Rand, says: "Authorities have estimated that 90 per cent of machine tool production may be accomplished through automatic controls by 1970. This is a big market, and with our development of an automatic programing system for a medium scale computer, we feel that we are in an excellent position to assist the industry in improving production efficiency."

***Automatic continuous or automatic batch-type finishing can be yours with the* NEW**

AUTOMATIC VIBRATRON®

by ROTO-FINISH/RANSOHOFF



IN LARGE PLANTS OR SMALL PLANTS, for continuous production or batch-type production, this new ***automatic*** *system cuts finishing costs.*

Eliminate direct labor. Reduce compound and media cost. Simplify materials handling, and improve quality . . . with the New Automatic Vibratron. You can place this machine ***anywhere*** *in your production line.*

Read How It Does More Work In Less Time At Lower Cost

See the Automatic Vibratron in operation at the Detroit Metal Show, Booth 1120. October 23-27

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BIG SAVINGS in Automatic Finishing Are Now Possible with the New

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For complete production flexibility, the Automatic Vibratron is available in two basic types, the Batch Automatic for batch production, and the Continuous Automatic for continuous production. Each is available in a complete range of sizes and capacities.

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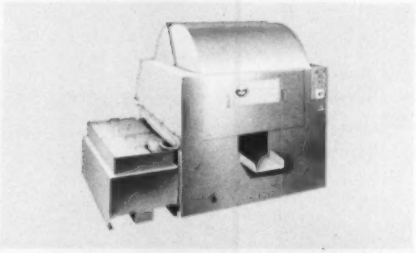

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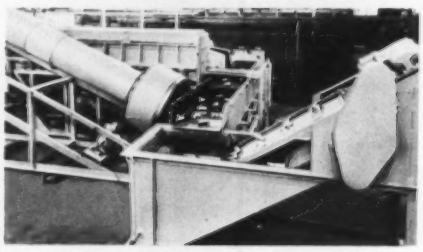

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Ruby Abrasive Grinds Hard Steels, 'Exotics'

RUBY COLORED grinding wheels, announced by Simonds Abrasive Co., Philadelphia, may make it easier to grind hard steels.

The company reports the wheels are tailored for hard tool and die steels, including air and oil hardening types, high carbon high chrome types, and high temperature abrasion resistant types. Also, the company says the wheels can help on some of the newer metals used in rockets and missiles.

The color comes from the fused crystalline aluminum oxide that's processed to a "high degree of friability." Used with a new vitrified bond, the abrasive (RH Borolon) gives the wheels friability and toughness, the company feels.

Advantages cited: It cuts cooler and stays sharp longer than conventional wheels.

• **Performance Reports**—Here are some case histories from Simonds:

1. On a T-5 tool steel, surface grinding had been producing burns and heat cracks. The new wheels produced no burn, even under removal rates ten times normal.

2. The ruby wheels produced twice the life of conventional wheels on a hob grinding job; production went up 50 per cent.

3. In resharpening M-2 tool steel center drills, the new wheels ground three times as many drills as previous methods, without dressing. Also, the cutting rate was boosted.

4. The new wheels also removed 0.050 in. depth stock in plunge form grinds on T-15 high speed tool steel with no burn and a metal-removal-to-wheel wear ratio of 25: 1.

Color TV Aids Steelmen

COLOR TV can help steelmakers determine operating conditions and temperatures in hazardous locations, says E.M.I. Electronics Ltd., Hayes, Middlesex, England.

The firm has produced a system that's controlled by an operator 1000 ft away. The picture can be displayed on a 21 in. screen, or enlarged by a projector on screens up to 12 x 18 ft.

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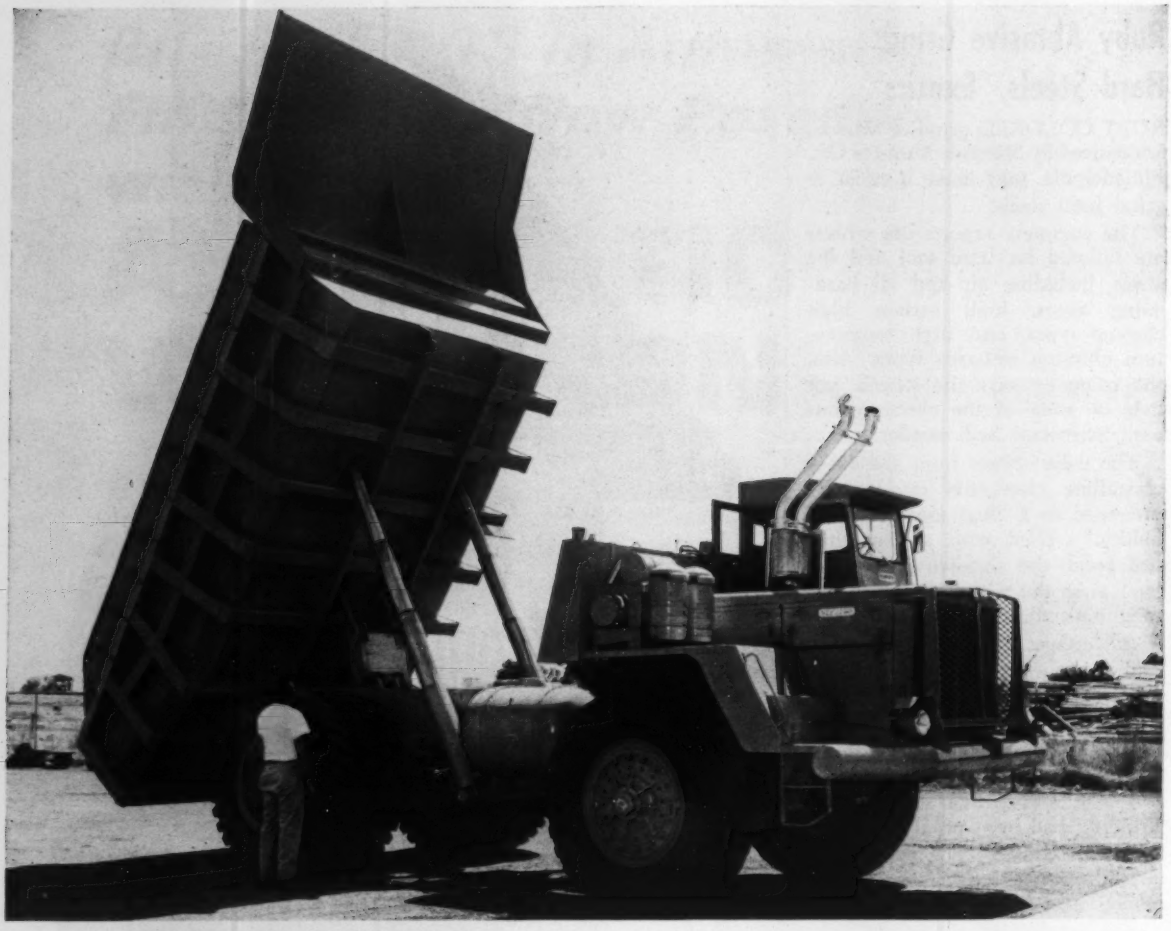
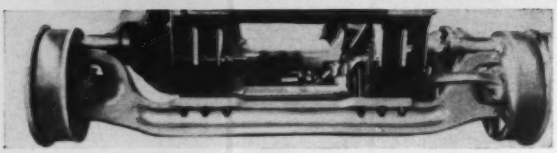




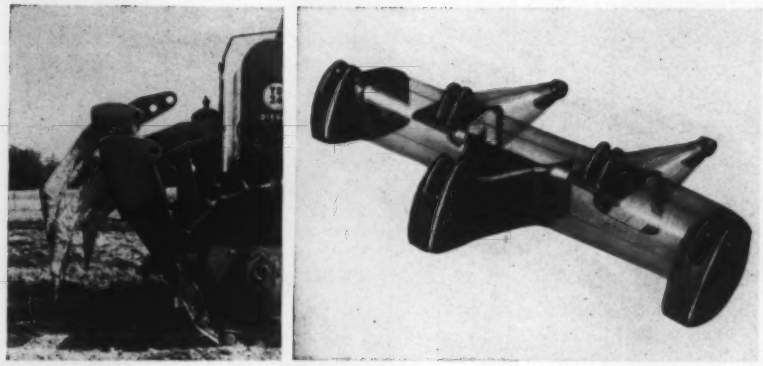
FRONT AXLE ASSEMBLY of heavy rock hauler has many castings, including an 1800 lb axle beam. More than 9000 lb of steel foundry products are used in the huge vehicle to insure strength in critical parts

Heavy Construction Machinery: Growth Market for Steel Castings

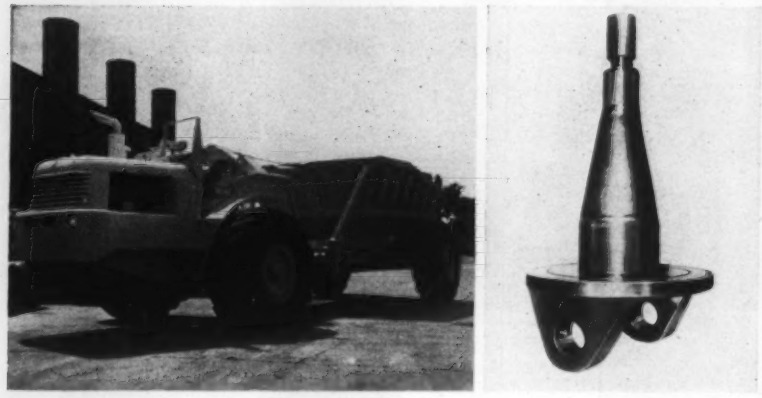
• USE of steel castings in heavy construction equipment is more than keeping pace with a growing market for heavy machinery. Production of castings for such applications increased about 41 per cent in the last decade—more than three times as much as the over-all market for steel foundry products.

Data source: Market statistics for the steel casting industry, compiled by Steel Founders' Society of America, Cleveland. The association reports that nearly 154,000 net tons of steel castings for heavy construction and earth moving machinery were produced by member companies in 1959—more than 16 per cent of steel foundry output for that year.

Advance information from the



COMBINATION OF CASTINGS AND FORMED PLATES cuts weight and production costs. It also added strength to the welded frame of rock ripper attachment for crawler tractor



KINGPIN that joins rock wagon to its tractor is a heat treated, alloy steel casting. Pin section is cored out for improved quenching, impact resistance

U. S. Department of Commerce indicates a 21.3 per cent increase in the production of construction machinery and equipment between 1951 and 1960.

• Low assembly costs and the ability to stand severe service are given credit for the popularity of castings.

The founders emphasize the desirability of producing steel parts in their final form. They point out that a wide range of shapes, many of them not economical to produce by other fabricating methods, can be made in the foundry. In some cases, cast-and-welded components can be employed for required strength and minimum over-all fabricating costs.

Metallurgical versatility is another characteristic that makes castings desirable, say the founders. Many modern steel castings are meeting severe service requirements because of their uniform, multidirectional grain structure, and their wide range of mechanical properties.

• High strength steel castings encourage increased use of foundry products in heavy machinery.

Society officials say a growing need for larger capacity machinery has led to greater use of castings in construction equipment. As demand grows for larger machines, strength requirements are multiplied. Use of cast steel components is often the most practical way to meet those requirements.

Example: High strength steel castings are used as axle spindles, tierod ends, and steering arms on a rock hauler than handles its gross load of 145,000 lb on two axles. More than 9000 lb of steel foundry products, including an 1800 lb front axle casting, are used in the huge vehicle.

Founders continue to increase the production of fully heat treated, high tensile steel castings. Some materials have tensile strengths up to 300,000 psi; more than 15 per cent of the steel castings made in 1959 had a tensile strength of more than 90,000 psi.

• The need for complete dependability with minimum weight often leads to redesign.

Heavy shock loads applied repeatedly to the kingpin on a rock wagon tractor prompted a search for engineering material that was dependable but as light as possible. Result: Redesign of the part, which is now made as a heat treated, alloy steel casting.

The pin section is cored out to reduce weight, permit better quenching, and to provide greater impact resistance.

Performance has been satisfactory, and manufacturing costs are about 5 per cent lower.

• Combination of casting and forging processes helped produce stronger wheel spindles for a self-propelled scraper.

Co-operative effort by the scraper manufacturer, the steel founder, and the forging company made it possible to engineer a dependable part at a favorable cost.

The castings are annealed; then the risers and gates are removed by burning and grinding. After inspection, the stub end of the spindle is forged to greater length and smaller cross section. Finally, the part is liquid quenched and tempered to 285-315 Bhn.

• Composite fabrication cuts down on weight and costs in the manufacture of a rock ripper.

Fabrication of the earth breaking device with steel castings and formed steel plates reduced manufacturing costs about 50 per cent and cut total weight by about 25 per cent. The castings are said to provide maximum strength and extremely good wear resistance on connecting parts.

Welding is speeded by casting in the chamfers. Curved surfaces of the fillet castings reduce stress concentrations at the juncture of arms and crossmembers. Careful stress analysis makes it possible to design parts with varying section thickness and minimize over-all weight.

At Granite City Steel...

MORGAN CRANES MOVE THE HEAVY LOADS

This 350/60/15 ton, 67′ span, ladle crane at Granite City, Illinois, demonstrates the extra quality steel companies expect—and get from Morgan. The photo at right shows the same crane undergoing a load test—carrying 451 tons—immediately after installation.

Efficiency and reliability in either mill modernization or expansion result when you have a Morgan Engineering man on your planning team. Call him to get facts on Morgan cranes and other Morgan mill equipment that will help speed production and lower your costs.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, blooming mills, structural mills, shears, saws, auxiliary equipment and welded fabrications.

Machine Finishes Sheets up to 49 in. Wide

THIS SINGLE pass finishing machine can take coils or sheets in any length (even production runs of random lengths) and widths up to 49 in. Thirty options are available.

High efficiency is claimed for operations such as derusting, roughing, polishing, buffing, satin finishing, delustering, rubbing, padding, wiping, sanding, brushing, cleaning, and waxing. Six major adjustments can be changed without stopping the unit. It can be switched to different operations in less than 5 minutes. Dimensions (not including feed or discharge conveyors) are 8 ft 3 in. wide, 5 ft 7 in. deep, and 5 ft 2 in. high. Low voltage control circuits incorporate safety guards against physical hazards and entry of foreign material.

For further information, *write* Clair Mfg. Co. Inc., Olean, N. Y.

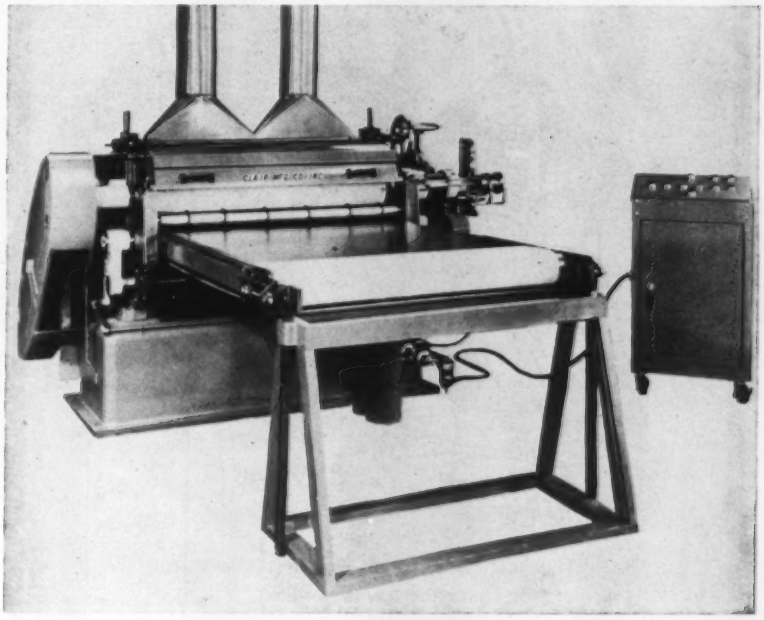
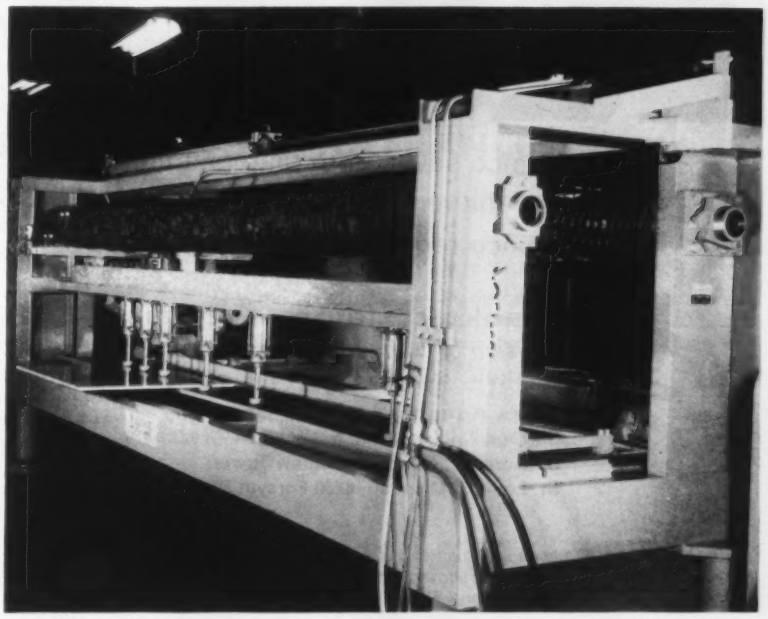


Plate Cutter Handles Ferrous, Nonferrous Metals

BOTH FERROUS and nonferrous metals can be cut on a machine developed by Wallace Supplies. Changeover time is less than 5 minutes.

On nonferrous metals, the cutting head is locked into a fixed position and traversed with the width of the bed (at variable speed). A carbide tipped wheel is used. Aluminum plates measuring 1 in. x 12 ft can be cut in less than a minute. A 4 in. aluminum plate can be cut at speeds of 4 ft or more per minute with a 60 to 100 microinch finish.

On ferrous metals, the head is unlocked to permit the abrasive wheel to sense its way through the cut as it oscillates back and forth. Cuts are completed at a rate of 3 (or less) seconds per square inch (1 in. x 10 ft equals 120 in. or 360 seconds or 6 minutes). The



"This year," says Chief, "you must take care,
With costs, the way they mount,
And wampum now so hard to get—
It's what you save that counts!"

KEMCO SILVERY PIG IRON

When you think of SILICON . . . think of KEMCO!

SILICON METAL - OTHER FERROALLOYS

Kemco saves both time and money.
Get the entire story from your
Kemco representative!

Keokuk Electro-Metals CO.
Division of Vanadium Corporation of America
Keokuk, Iowa • Wenatchee, Washington

Sales Agent: Miller and Company
Chicago 4, Illinois, 332 S. Michigan Avenue
Cincinnati 2, Ohio, 3504 Carew Tower
St. Louis 5, Missouri, 8230 Forsyth Blvd.

The superior form of silicon introduction . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . In regular analysis or alloyed with other elements. For uniform high purity, aluminum producers specify Kemco Silicon Metal.

unit makes a 2 in. x 10 ft cut in 12 minutes (maximum). Normal finish on steel is less than 125 microinches. The larger 26 in. diameter wheel can cut 4 in. stainless plate and produce two square, straight edges in less than 24 minutes. The company says metallurgical quality of the plate is not changed. A gage is standard equipment.

For further information, *write* Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill.

Offers OBI Press Line

OBI PRESSES (with double back gearing) are available in capacities of 40 to 200 tons. The flywheel type is rated at 40 to 75 tons.

The press stroke can be made in lengths to suit requirements. For drawing operations, the press bed may be equipped with a die cushion. The gap type frame makes it possible to incline the press. It is equipped with a pneumatic friction clutch and brake unit.

Other developments include a 600 ton, single back, geared press with die area lighting.

For further information, *write* Federal Warco Div., McKay Machine Co., Warren, Ohio.

Axial Piston Designed Into Hydraulic Pump

A HYDRAULIC pump of axial piston design provides a reliable combination of high speed and pressure capability in a unit of minimum size and weight. Other features include control versatility and high over-all efficiency.

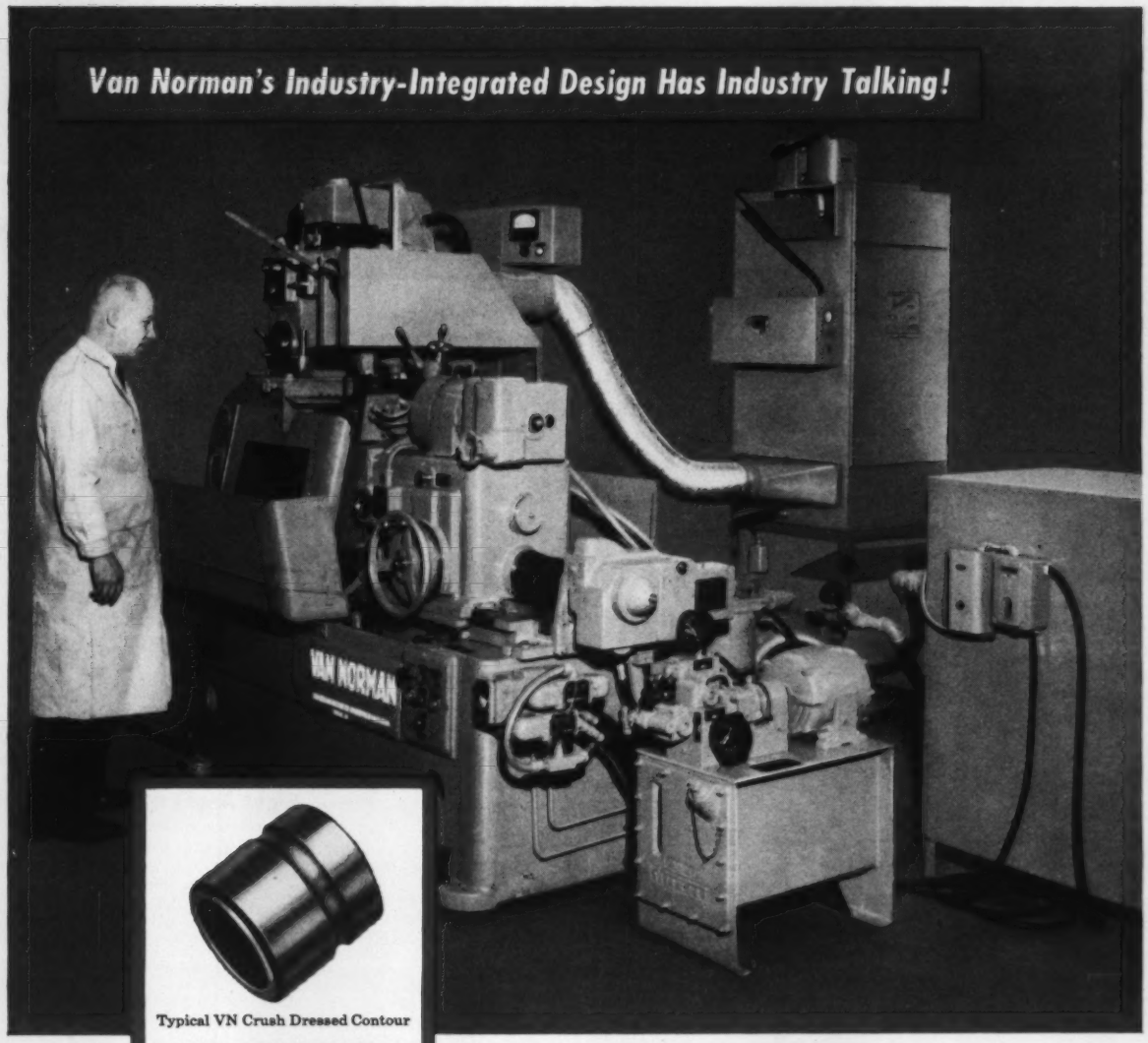
The unit, the Weatherhead WO7, incorporates JIC and SAE specifications for industrial and mobile use. It also meets military specifications.

Applications for the WO7 include machine tools, material handling, mobile construction, transportation, and metal fabricating equipment.

Nominal output rating: 9 gpm

(*Please turn to Page* 126)

Van Norman's Industry-Integrated Design Has Industry Talking!



Typical VN Crush Dressed Contour

VAN NORMAN CRUSH FORM GRINDS MANY PARTS AT HIGH SPEED . . . CLOSE TOLERANCES

VN Centerless Grinders volume-produce or handle limited runs with equal versatility . . . economy

A Van Norman Centerless Grinder, with crush dress equipment, will grind intricate shapes and volume-produce many parts previously thought impossible.

Faster Output To Close Tolerances—typical of the high-speed, close-tolerance operations performed by Van Norman is the crush formed part shown. A crush formed wheel grinds the O.D. and ball race simultaneously, holding .005 radius on the corner of the ball race, .001 tolerance on race curvature and .0005 on the O.D. and diameter of the ball race, with 10-12 RMS finish. This part is ground in one operation, after a Thru-Feed grind on O.D. In the finish grind operation the O.D. and ball race are ground simultaneously to insure concentricity. Stock removal .004; Infeed cycle 12 seconds. Result: five parts are finished per minute, 300 per hour.

Free Booklet—**"Centerless Grinding"**—valuable guide to high production, lower costs. For your copy, contact factory or your local distributor. 4134

VAN NORMAN MACHINE COMPANY

SPRINGFIELD 7, MASSACHUSETTS • A DIVISION OF VAN NORMAN INDUSTRIES, INCORPORATED

VN

FALK INTRODUCES 2 NEW SERIES OF VERSATILE SPEED REDUCERS

Designed to serve industry's current and future requirements

Type YB
Right Angle Horizontal
(write for Bulletin 2100)

Type Y Parallel Shaft
(write for Bulletin 1100)

Parallel Shaft and Right Angle Horizontal Reducers cataloged thru 1,570,000 lb-in. torque at low speed shaft ...larger units upon request. Ratios 1.84 thru 292 to 1 for parallel shaft; 5.06 thru 1207 to 1 for right angle horizontal

These new units are probably the most thoroughly engineered speed reducers on the market today. Final designs based upon years of development study and a background of 50 years experience make these units as dependable as the name "FALK". A few of their many features are...

PINPOINT APPLICATION COVERAGE Wide choice of sizes and ratios permits the most economical selection of a correctly rated unit for each application. In each series of parallel shaft and right angle reducers, cataloged sizes range up to 1,570,000 lb-in. torque at the (11 inch dia.) low speed shaft. (Other standard designs to 25,000,000 lb-in. torque; custom designs for higher capacities.)

UNMATCHED VERSATILITY The "Basic Y" speed reducer design permits economical modification to meet a multitude of specific requirements. Smooth, flat surfaces simplify mounting of motor brackets, backstops, brakes, and any number of other accessories.

RUGGED HOUSINGS Sturdy housings not only provide maximum rigidity to maintain proper alignment of gearing, but also have the strength to support heavy overhung loads and withstand accidental blows.

DEPENDABLE FALK GEARING Gears are selected with the proper proportions and hardness to provide the optimum combination of maximum durability and strength for high shock as well as uniform loads.

BEARINGS TO SUIT THE OVERHUNG LOAD Standard reducers can meet custom-built requirements with optional stock bearings and shafts (at only a nominal extra charge.) Maximum overhung load capacities are so great that for some conditions, still within the capacity of the reducer, extra strong supporting foundations and bolts must be provided.

DOUBLE GEAR LIFE Standard double ended shafts can be reversed end for end to bring into contact the unused surfaces of the gear teeth for twice the normal gear life.

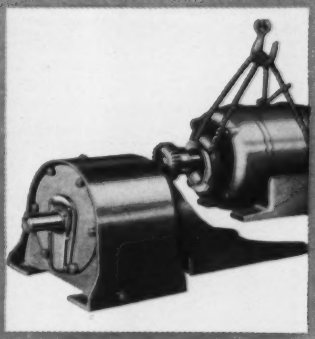
SEALS FOR ALL CONDITIONS Standard equipment oil seals assure oil-tight and dirt-free gear units for normal applications. Standard abrasive and moisture-resistant seals available upon order.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

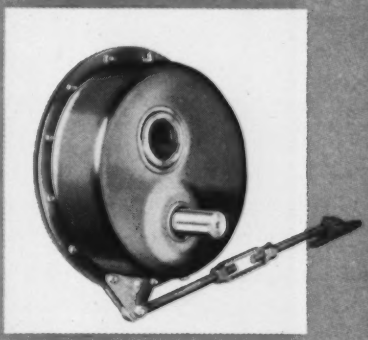
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

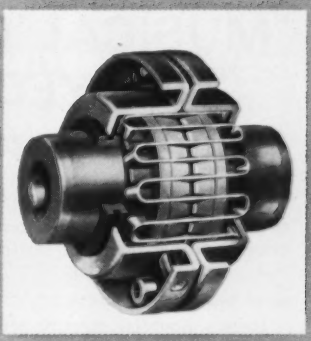
SOME OTHER MEMBERS OF AMERICA'S FIRST FAMILY OF POWER TRANSMISSION PRODUCTS



ALL-MOTOR MOTOREDUCERS



SHAFT MOUNTED DRIVES

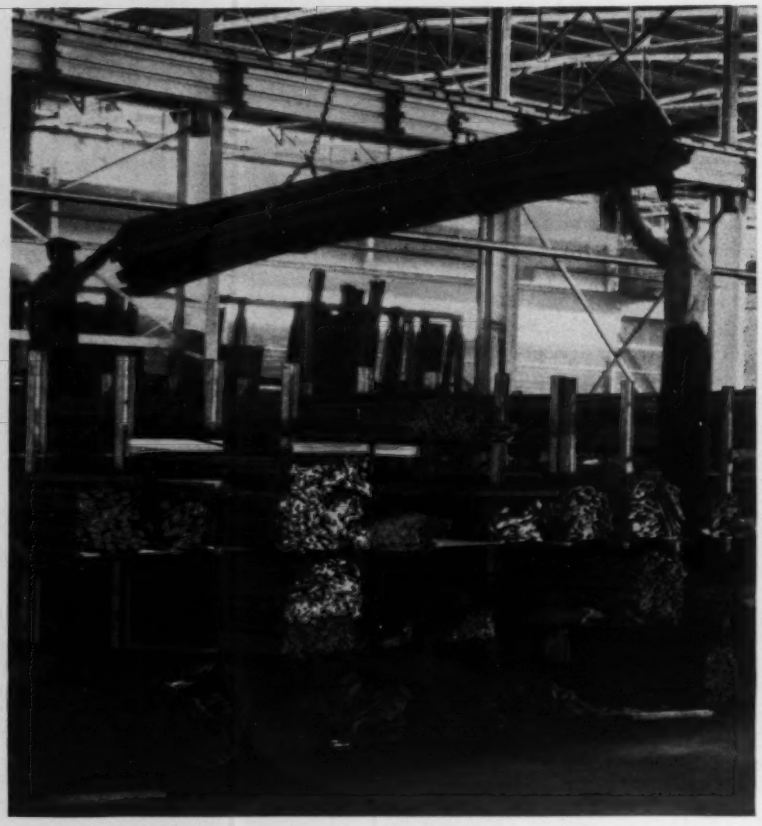


STEELFLEX COUPLINGS

FALK

A GOOD NAME IN INDUSTRY

FALK, ALL-MOTOR, and STEELFLEX are registered trademarks



"MUSICAL CHAIRS" PLAYED WITH STEEL...
sour note in cost of possession

The rumble of an overhead crane . . . the klaxon on a fork lift . . . the silence of a machine tool not operating . . . while the right bars of steel are uncovered from the bottom of the stock pile.

All this loses money . . . and time . . . and production. It's a part of your *cost of possession.*

Here's how to greatly reduce the dead-loss cost of handling and re-handling steel stocks . . .

Call on your nearby steel service center for steel delivered when you need it, to the plant dock handy to the machines that will process it, ready to use without delay.

To help your production and cost accounting people in figuring the true cost of steel stocks, ask your steel service center salesman for the booklet, *What's Your Real Cost of Possession for Steel?* Or write to Steel Service Center Institute.

COST OF POSSESSION... *to determine your own cost of possession for steel in inventory, consider all these factors:*

Cost of capital: inventory, space, equipment—Cost of operation: space, material handling, cutting and burning, scrap and wastage—Other costs: obsolescence, insurance, taxes, accounting

YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE
540-G Terminal Tower • Cleveland 13, Ohio

Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

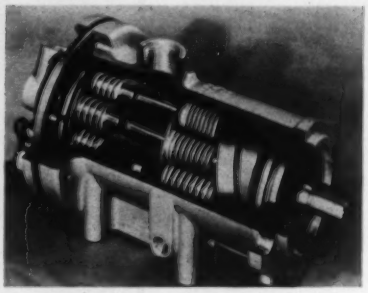
STEEL SERVICE CENTER INSTITUTE

NEW PRODUCTS and equipment

(*Continued from Page* 122)

at 3600 rpm (continuous) at 3000 psi (controls available from 250 to 3000 psi). Speed range: 450 to 4500 rpm.

The unit has a hydrostatically balanced cylinder block (nonrotatable) with seven pumping pistons driven by fixed angle rotating cam and wobble type reaction plate. Only two rotating components (a driveshaft and cam) are used. Bearings are available for a wide variety of fluids.



Four options are available for displacement control: 1. Internal pressure compensation (alternate control with close regulation). 2. Manual handwheel control (available with or without internal pressure compensator). 3. Manual lever control (operable from simple push-pull control cable). 4. Servocontrol (responds to remote hydraulic signal). The unit weighs 14 lb and is 9⅝ in. long and 5¼ in. in diameter.

For further information, *write* Weatherhead Co., 300 E. 131st St., Cleveland, Ohio.

Tool, Not Work, Moved On Versatile Drill Press

THE DELTA Unidrill fills the gap between expensive, machine tool type, radial drill presses and light duty machines. Eight models are available.

To save time and labor, the tool, instead of the work, is moved and positioned. The company says it can be readily moved from one work area to another. The oper-

ator can quickly position the head from one central control station, and the feed handle remains within easy reach. The cutting tool can be positioned to the work in five different ways: 1. Move the mechanism up and down the main column. 2. Swivel the mechanism 360 degrees around the main column. 3. Rotate the head around the mounting post. 4. Move the head in and out from the column. 5. Tilt the head 45 degrees to the left or right.

Table size is 23½ x 25⅛ in.

For further information, *write* Power Tool Div., Rockwell Mfg. Co., 492 N. Lexington Ave., Pittsburgh 8, Pa.

Machine Prints Labels On Box Shaped Covers

MARKEM'S Model 154A can imprint labels on three surfaces of box shaped covers (voltage regulator covers, for example) at speeds to 1000 units per hour. It can handle metals, cardboard, plastics, glass, and other materials.

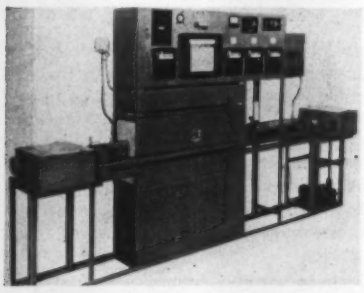
Neat, durable imprints range up to 2 x 6 in. in size. Markem specialty inks are used.

For further information, *write* Markem Machine Co., Keene 68, N. H.

Soldering Furnace Produces Uniform Results

UNIFORM results at low costs are claimed by BTU Engineering for its TSH production soldering furnace. It can be loaded and unloaded from a single station. A continuous, horizontal, closed loop chain drive is equipped with boats for parts or preloaded fixtures. The

(*Please turn to Page* 130)



FAST DELIVERY...LOCAL STOCKS

A time-saving benefit offered by your steel service center

The right steel at the right time . . . when you want it, where you need it . . . because steel service center stocks are located near you. And are delivered directly to the right production area of your plant by the fastest means.

The proper steel for the particular job . . . no make-do with not-quite-right steel that uses up machine time and man-hours to make it almost fit the job.

Your nearby steel service center is customer-oriented . . . is interested in your problems and needs, and provides neighborly service. He reduces your "cost of possession" for steel, too. Call on him for help in improving production, quality, delivery, and price of your product.

YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE

Terminal Tower • Cleveland 13, Ohio

Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

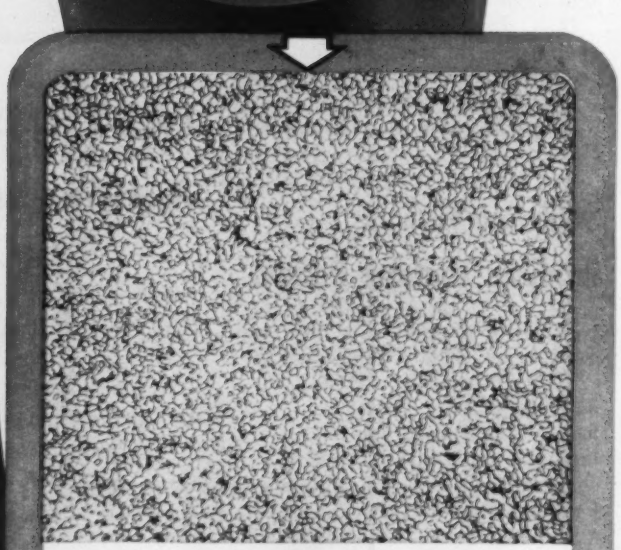
Steel

STEEL SERVICE CENTER INSTITUTE

Custom Quality

OHIO COLD DRAWN

features improved physicals, closer tolerances, better finish



Arrows indicate approximate center of weld line. After normalizing, cold drawing and annealing, the weld area cannot be detected even when the polished and acid-etched surface is magnified 100 diameters. This perfect microstructure makes Ohio Drawn-Welded, in every sense, weldless — an ideal tubing for critical mechanical and pressure applications. In addition to cold drawing, a severe test in itself, non-destructive tests such as air, water, magnetic and eddy current, insure 100% acceptability.

A-4363A

WELDED STEEL TUBING

Now Available in Larger Sizes... Heavier Wall Thicknesses

NEWS ITEM:

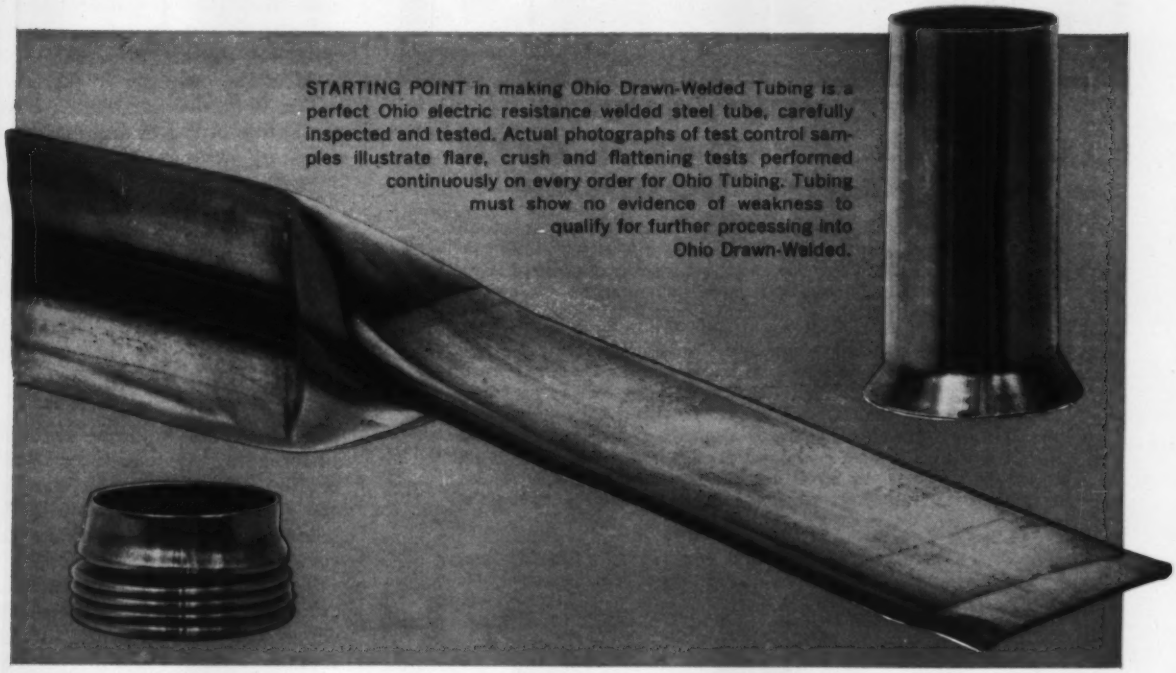
Ohio Seamless is now cold drawing quality electric resistance welded steel tubing up to 7¼ inches with wall thicknesses to .344. Ohio Custom Made Drawn-Welded Tubing is here now — in greater range of sizes, wall thicknesses, finishes than ever before.

TECHNICAL ITEM:

Controlled normalizing assures desired microstructure . . . Precision cold drawing imparts special physical properties, assures uniform wall thickness, delivers closer dimensional tolerances and superior surface finish.

ACTION ITEM:

This all adds up to a new major-source capability that can help you design with new freedom, manufacture at lower costs. Mark your orders: Ohio Custom Made Tubing. Either welded or seamless, it's your best buy whenever tubing is the best shape.



STARTING POINT in making Ohio Drawn-Welded Tubing is a perfect Ohio electric resistance welded steel tube, carefully inspected and tested. Actual photographs of test control samples illustrate flare, crush and flattening tests performed continuously on every order for Ohio Tubing. Tubing must show no evidence of weakness to qualify for further processing into Ohio Drawn-Welded.

OHIO

OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • **SHELBY, OHIO**

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Representatives in principal cities. Check leading directories:
THOMAS', MacRAE'S, CONOVER-MAST, SWEET'S, FRASER'S.

MEEHANITE MEANS BETTER CASTINGS®

Standard construction materials for all Blackmer Vari-Flo pumps is high strength, pressure-tight Meehanite Nodular Iron. It provides the necessary mechanical properties and is less costly than steel, particularly from the standpoint of machining. The intricate rotor shown, a critical internal part subject to high stresses, is cast in type SP-80 to insure top performance under the most severe service conditions.

SOLVE YOUR TOUGH CASTING PROBLEMS WITH MEEHANITE NODULAR

The excellent castability of Meehanite Nodular in combination with exceptional strength, ductility and wear resistance has led to its wide acceptance for intricate pressure castings and many other components which must withstand severe service conditions. The broad range of its utility is further enhanced by inherent production advantages resulting in a reduction of manufacturing costs.

Meehanite Nodular is available in a broad range of properties embracing all current Nodular specifications and including some unique new wear and heat resisting types. When you specify one of the S types of Meehanite Nodular, you can be sure of obtaining castings that live up to specified claims. Meehanite foundries have more than a quarter of a century of experience in handling the essential materials used to convert the graphite in cast iron from the flake form to the nodular which gives this family of metals its unique engineering properties. Meehanite patented quality controls assure uniform dependability regardless of how small or how large the casting.

For complete information about Meehanite Nodular, send for a free single copy of our eight page brochure (B-47-A). Write: Meehanite Metal Corporation, 714 North Avenue, New Rochelle, New York.

MEEHANITE METAL

MEEHANITE CASTINGS ARE MADE ONLY BY MEEHANITE FOUNDRIES.

NEW PRODUCTS and equipment

(*Concluded from Page* 127)

fixtures move into the furnace where parts are soldered in a hydrogen atmosphere (it eliminates the need for flux) and then returned to the loading station.

Temperature profiles of the product can be controlled to ±33.8° F. The furnace is rated to 1112° F.

For further information, *write* BTU Engineering Corp., 179 Bear Hill Rd., Waltham 54, Mass.

Dial Type, Multihead Unit Features Tape Control

NUMERICAL CONTROL is a feature of a dial type, multihead machine that makes use of punched tape to drill, ream, and counterbore a variety of cast iron flywheels for diesel engines. The company says it can efficiently handle a wide variety of low production, metalworking machining applications.

Controlled by a General Electric Mark I, numerical control system, the unit uses the punched tape to index the table to proper position and also to initiate automatic feed cycles for the machining units located at the periphery of the table.

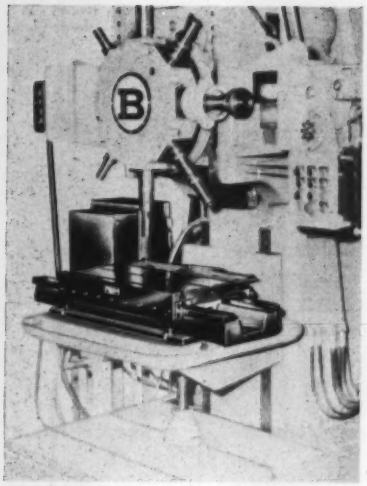
The 34 in. diameter table indexes at the rate of 2 rpm and maintains a spacing accuracy of ±0.0005 in. on a 32 in. diameter.

For further information, *write* Snyder Corp., 3400 E. Lafayette Ave., Detroit 7, Mich.

Positioning Automatic on Index Slide Table

AUTOMATIC, multiple work positioning in any desired cycle can readily be provided on standard and special machine tools with an indexing slide table package developed by Gilman.

The slide table can be used as original equipment on special machines or as a productive attachment for standard, turret type, drilling machines; multispindle drilling machines, upright drills, boring units, and other equipment where the tooling feeds into the work. With a controlled feed rate, the slide



can also be used for certain milling and slotting.

For further information, *write* Russell T. Gilman Inc., 623 Beech St., Grafton, Wis.

Temperature Indicator Offered in Pressure Can

EIGHT ratings of a temperature indicator (650 to 1000° F) are available in pressurized containers.

Applications of Tempilaq°: Nondestructive testing of honeycomb panels, monitoring the operating temperatures of reaction vessels, fabrication of massive structures, heating, preheating, and stress relieving large areas.

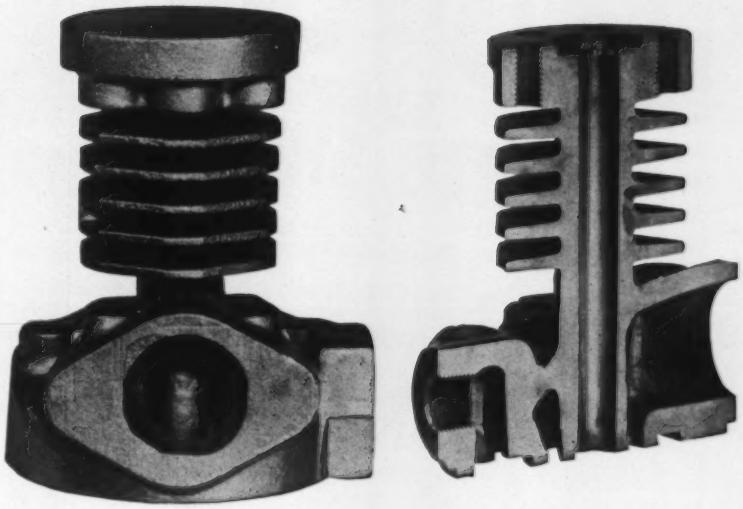
For further information, *write* Tempil° Corp., 132 W. 22nd St., New York 11, N. Y.

System Trims Co-ordinate Setup Time on Lathes

A CO-ORDINATE setup system (Minuteman) is standard equipment on a line of numerically controlled lathes. It features low setup time and simple operation.

The unit establishes a constant zero-zero position for succeeding like pieces and maintains it in case of work stoppages due to power failure or other reasons.

Based on the principle of preset interchangeable tool turrets and an adjustable limit switch stop, the Minuteman can reduce co-ordinate setup time to as little as 3 minutes, says American Tool Works



HIGH PRESSURE LOW COST

This 8 pound Meehanite Metal casting made for the Joy Manufacturing Co. by Hamilton Foundry is a fourth stage air compressor cylinder. Pressures build up to 6,000 p.s.i. and require a high strength, pressure tight and wear resisting casting. Alloyed Meehanite®, oil quenched and tempered, raised Brinell hardness of the cylinder wall to 275-300, and increased tensile strength to 60,000 p.s.i. Meehanite was chosen for this casting because controlled structure and small uniform flake graphite produce pressure tight castings of uniform density and strength.

Manufacturing costs drop when uniform, high quality castings go through production. In this case, Meehanite castings from Hamilton Foundry give Joy tight control on finished parts costs by combining dimensional accuracy, uniform machinability, a low rejection rate, and delivery on schedule. Pressure tightness, long service life and fine surface finish insure Joy's reputation for product quality.

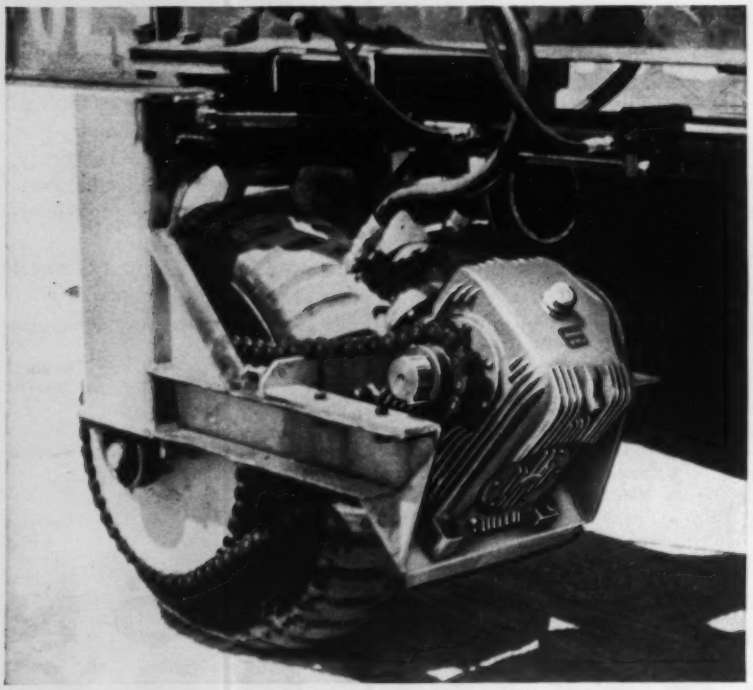
When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules—will be met.

GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

(Advertisement)



STURGEON BAY, Wisc. Manufacturer solves drive problem for traveling crane by mounting hydraulic motor-driven speed reducer at wheel. Double-enveloping worm gear design permits compact unit necessary for application. Available from Cone-Drive Gears, Div. Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Michigan.

NEW PRODUCTS and equipment

Co. Tape to tool accuracies of ±0.0005 in. and repeatability of ±0.00025 in. are possible.

The lathes come in six sizes, each controlled by a GE, Mark Century, continuous path control system. Models 2010, 2413, 2514, 3019, 4025, and 4732 handle turning, facing, boring, and form tool machining.

A double electric clutch (tape controlled) in the cross and longitudinal feed units operates with a tape controlled, direct current motor (variable speed) and a manual, 10:1 reduction shift to give 2000 cross and longitudinal feeds. Extra fine feeds (0.010 to 20 in. per minute) make low speeds usable on hard, exotic metals and for form toolwork.

For further information, *write* American Tool Works Co., Pearl at Eggleston Ave., Cincinnati 2, Ohio.

Plasma Cutting Torch Slices Tough Metals

A PLASMA cutting torch uses a 30,000° F flame to slice through tungsten, titanium, Monel, Inconel, or stainless steel. The company says cut quality is high. Dross in the kerf region is absent.

The company says the speed and cutting ability of the torch is due to the relatively new transferred arc technique.

Other features include simple adjustments for cutting a wide variety of materials, absence of customary heatup time, and a wide tolerance in torch standoff distance.

For further information, *write* Plasmadyne Corp., a Giannini Scientific company, 3839 S. Main St., Santa Ana, Calif.

FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING . . . P&H!

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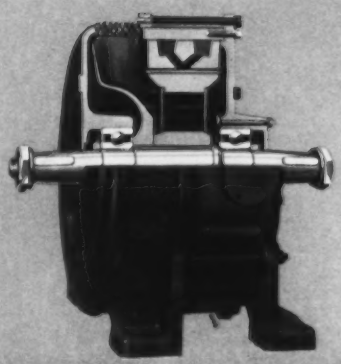

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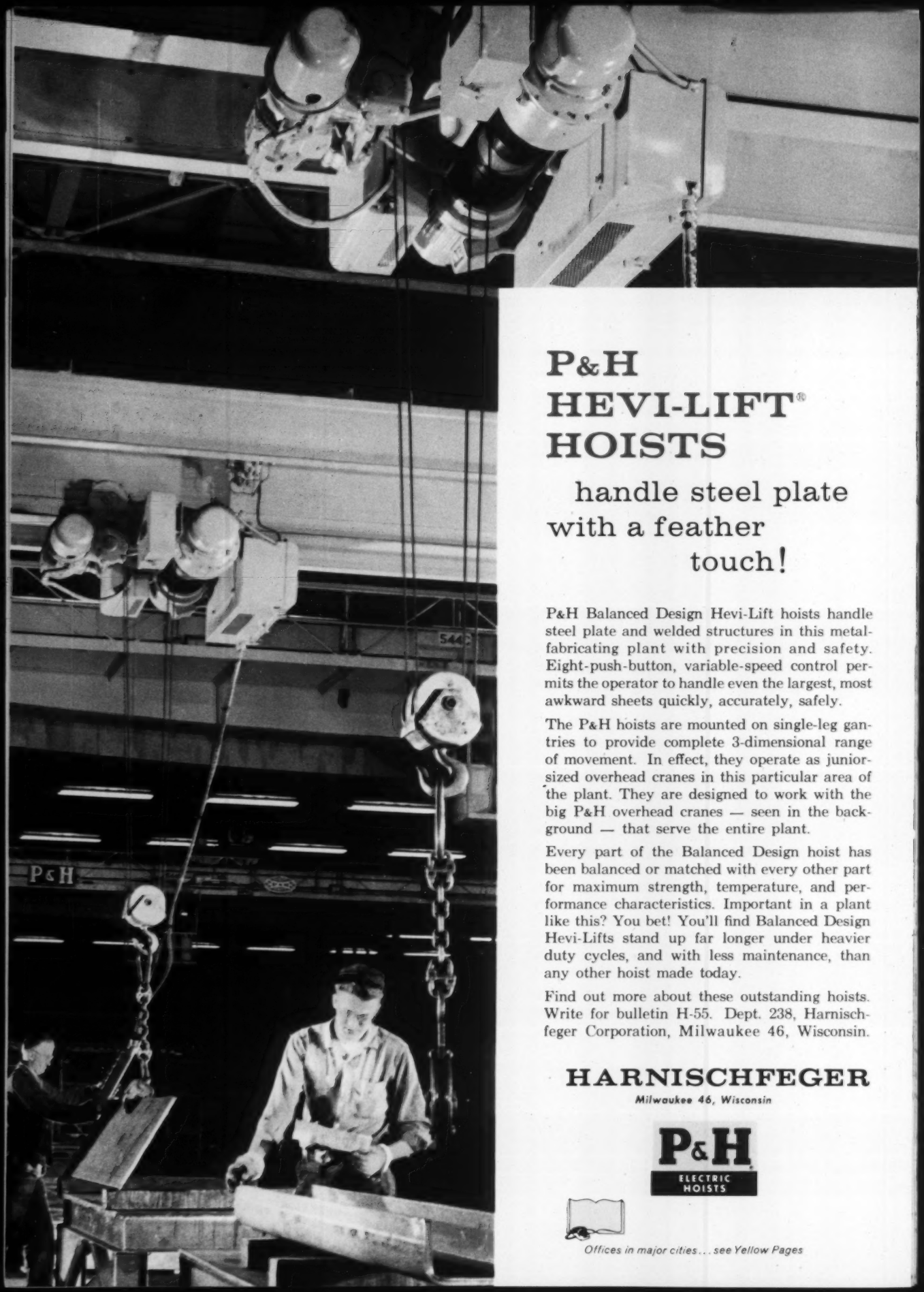

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NEW literature

Write directly to the company for a copy

Diamond Grinding Standard

American Standard Specifications for Shapes and Sizes of Diamond Grinding Wheels, Hand Hones and Mounted Wheels (B74.3-1961) was approved Feb. 8, 1961. It contains 37 pages of information on standard shapes and sizes. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

Solid Film Lubricants

Two publications present information on solid film lubricants for extreme environmental conditions. Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn.

Steam-Detergent Cleaning

Techniques and tips for up to date steam cleaning with detergents is discussed in a four page booklet. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

NEW BOOKS

Programming Computers for Business Applications, Ned Chapin, McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y., 269 pages, $7.50

A practical approach to programing is stressed, based on experience gathered from hundreds of data processing applications. Designed to help the reader learn programing, the book does not require a background in mathematics, nor is expert knowledge of computers necessary.

Steels for Reactor Pressure Circuits, Iron & Steel Institute, 4 Grosvenor Gardens, London S.W. 1, England, 587 pages, $9.10

The volume is a report of a symposium held in London (Nov. 30 to Dec. 2, 1960) by the Iron & Steel Institute for the British Nuclear Energy Conference. Topics covered include high temperature properties, corrosion, fabrication, irradiation effects, and steels for future reactors.

Engineering Management and Administration, Val Cronstedt, McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y., 350 pages, $8.50

Essentially a "how-to" reference, this book describes how to run an engineering department in the modern industrial plant. The author advocates removal of all administrative duties from technical personnel and describes the administrator's role and responsibilities both to general management and to the engineering department. A presentation is made of sample procedures for making engineering changes, administering budgets, development of compensation plans, guides in the preparation of operating manuals, and similar items.

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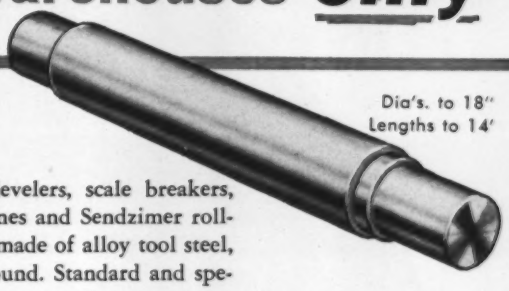

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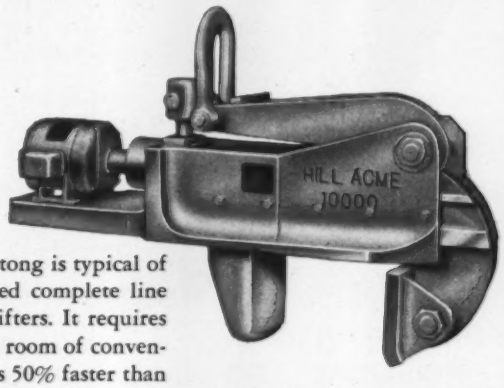

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Auto Strikes Delay Shipments

LOOK for steelmakers to have a good September in spite of the strikes that plagued the auto industry last week.

Barring extended shutdowns at key plants of the Big Three, September steel shipments should at least equal last month's. It's doubtful that they'll exceed August's for two reasons: 1. The strikes created shortages of critically needed parts and prevented automakers from reaching volume production as rapidly as they had planned. 2. September ends on a weekend and has three less shipping days than August.

FEW HOLDUPS AT FIRST— General Motors Corp. reacted to the wave of strikes by telling steelmakers to stop truck shipments to auto plants near their mills but to continue shipping by rail to more distant plants. The automaker hoped, of course, that local disputes would be cleared up by the time the steel reached its destination. Ford Motor Co. and Chrysler Corp., uncertain whether they would be struck when their contract extensions expired, hoped for the best and delayed telling steelmakers to withhold shipments.

At steel plants, the instructions from General Motors to stop truck shipments created storage problems but had no immediate impact on ingot production or rolling schedules. Steelmen, like their customers, counted on a quick settlement.

LONG STRIKE COULD HURT— But they weren't minimizing the serious impact that extended shutdowns at key auto plants could have. A leading producer of automotive sheets told STEEL that its September shipments would certainly fall short of August's if the strikes against General Motors weren't settled this month. "We're concerned but not frantic," a company spokesman said. "Luckily, bigger shipments to nonautomotive customers will partly offset shipping losses due to auto industry strikes. A lot of miscellaneous users are coming back into the market. Their inventories aren't big enough to support the higher levels of production that they're planning."

OCTOBER OUTLOOK BRIGHT— Orders for October are running slightly ahead of those entered for any prior month this year, Chicago mills report. In the East, steelmakers are a little less optimistic. Their sales are on a plateau. Although it's too early to say with certainty how October will shape up—users are still buying hand to mouth—there's a good chance that next month's shipments will be larger than first predicted. Reason: Part of the tonnage shipped in October may be steel that automakers deferred from September.

NO HEDGING APPARENT— Since most steel producers have finishing capacity to spare and can promise fast service on all but a few products, buyers are under no pressure to order farther ahead. Nevertheless, some are being prudent. They're starting to ask more questions about future deliveries. In some cases, they're considering placing dummy orders to protect their positions on mill books. There's no evidence that they're building inventories in anticipation of a price hike in October. President Kennedy's plea to steelmakers to absorb added labor costs may have quieted fears of a price move, but industry leaders haven't committed themselves to hold the line.

PRODUCTION STEADY— Look for ingot production in the week ending Sept. 23 to be about the same as the 2,050,000 tons that STEEL estimates the industry poured in the week ended Sept. 16. Output then was 0.9 per cent above that of the previous week.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	142	148
Reinforcing	142	149
Boiler Tubes	...	153
Canada	...	156
Charts:		
Finished Steel	...	147
Ingot Rate	146	...
Scrap Prices	...	159
Clad Steel	...	154
Coal Chemicals	...	156
Coke	165	156
Comparisons	...	147
Containers	166	...
Contracts Placed	144	...
Contracts Pend.	145	...
Electrodes	...	*
Employment	165	...
Fasteners	...	153
Ferroalloys	...	157
Fluorspar	...	156
Footnotes	...	153
Imported Steel	...	156
Ingot Production	146	...
Metal Powder	...	156
Nonferrous Met.	162	164
Ores	...	156
Pig Iron	166	155
Piling	...	148
Plates	143	148
Plating Material	...	165
Prestressed Strand	...	153
Price Indexes	...	147
Producers' Key	149	...
R.R. Materials	142	153
Refractories	...	156
Scrap	159	160
Semifinished	...	148
Service Centers	142	155
Sheets	141	149
Silicon Steel	...	150
Stainless Steel	...	154
Steel Shipments	143	...
Strip	141	150
Structurals	144	148
Tin Mill Prod.	141	150
Tool Steel	...	154
Tubular Goods	141	154
Wire	143	150

*Current prices were published in the Sept. 11 issue and will appear in subsequent issues.

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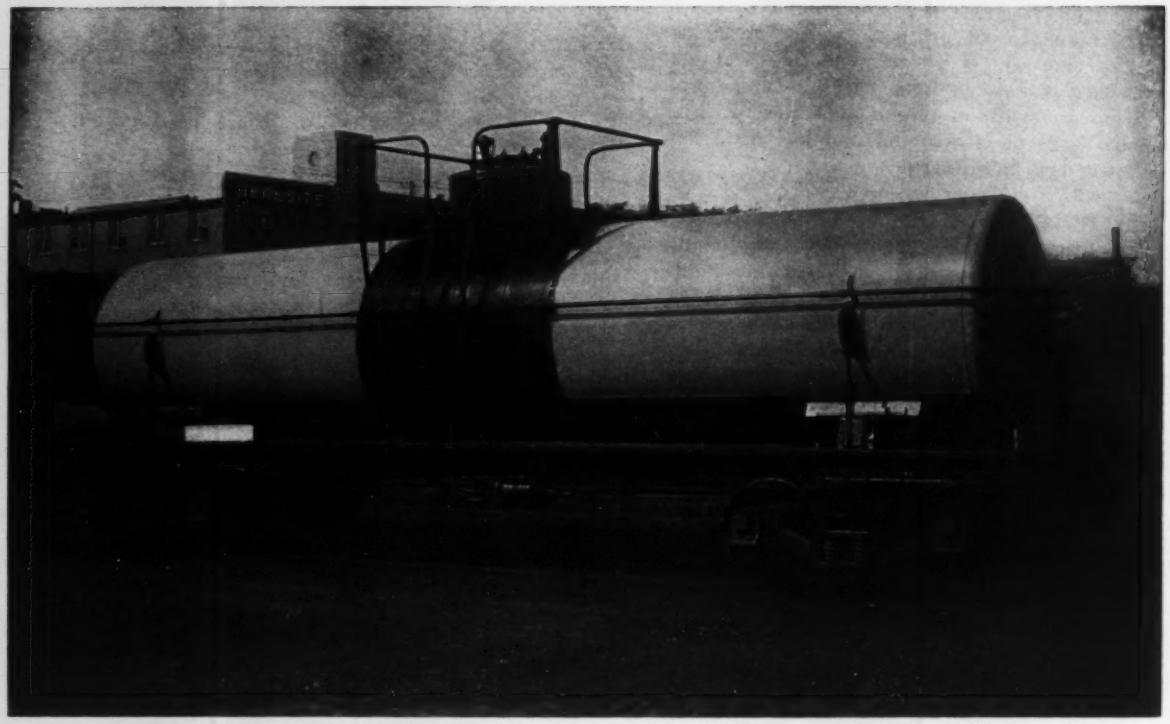

Since 1947 more than 3,000 railroad tank cars have been lined with HERESITE pure phenolic resinous coatings. These tank cars were used for transportation of corrosive chemicals and the majority of them for sulphuric acid transportation. In general this coating was of a dark brown color. Now there also are light colored HERESITE coatings available for the transportation of food products. These colors are cream color, aluminum, and yellow. The colored coatings have almost the same resistance as the original Heresite P-403 lining which is used exclusively for transportation of corrosive chemicals.

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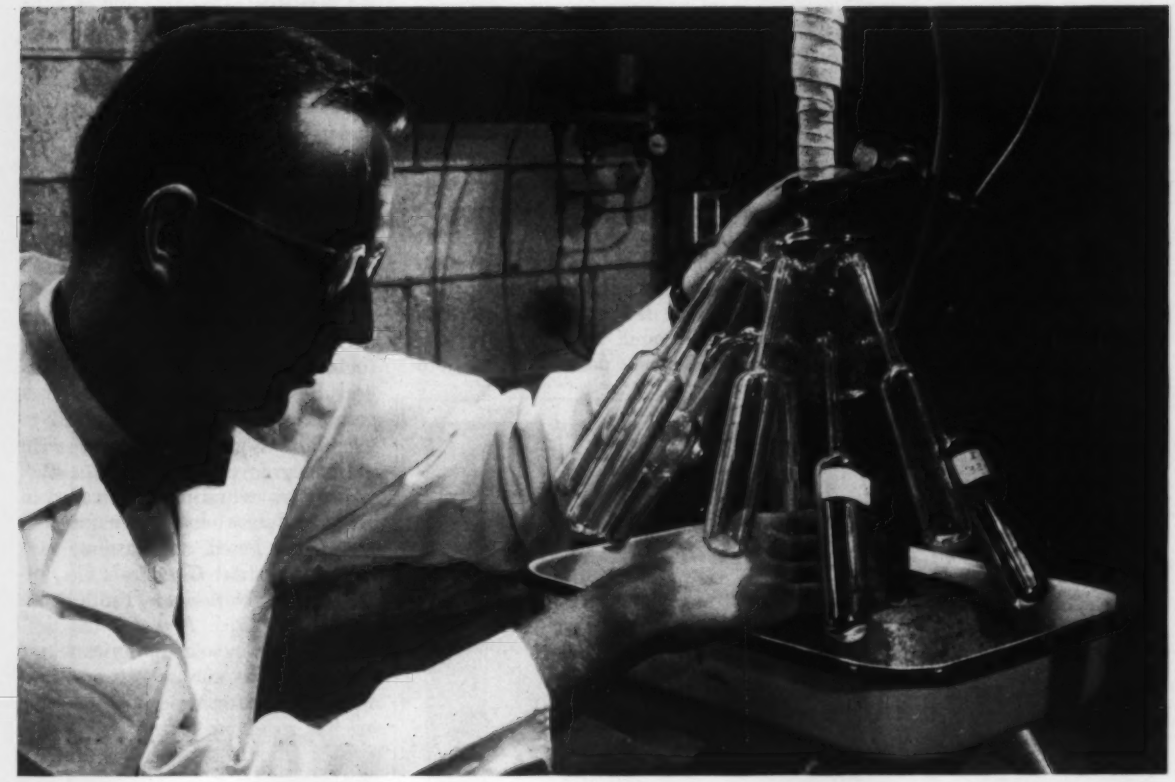


Because cesium is so reactive, recovery of the metal from its compounds must be conducted under an inert atmosphere. Here, newly made cesium at Dow Chemical Co. is transferred into a "porcupine" container. Individual ampules can be sealed off without contaminating the metal

Cesium Picked for Stardom in Space

AN OFTEN REJECTED metal, cesium, has the potential to become a key material in the U. S. race to the planets. It's a material metalworking managers are going to hear a lot more about in the next few years.

Cesium is a true Space Age metal. All of its potentials rest on techniques and technologies undreamed of a few years ago. Consumption is set to spurt in such glamorous fields as ion propulsion, thermionics, and magnetohydrodynamics (MHD).

• **One Big Asset** — If predictions come true, it will be one of the most popular of the "newer" metals before the decade is out. This is a new twist for cesium. The metal has been around since 1860 but only minor use has been made of it because technology hasn't been ready for it. The reason: Few metals have a greater combination of undesirable characteristics.

Cesium will melt from the heat of your hand. It explodes on contact with water. When exposed to air, it instantly bursts into flame. It's the softest, but also the heaviest, of the alkali metals. It is worthless as a structural material.

But cesium has one big plus over the stronger, more stable metals. It has the greatest tendency to ionize of any metal. All uses are based on this property.

• **To the Stars**—Late next year, the National Aeronautics & Space Administration will test an ion-propelled space vehicle. If the ion engine lives up to expectations, a multimillion pound a year market for cesium will develop almost overnight.

Outside the earth's atmosphere, the ion engine propels a ship through space by shooting a stream of ions through an exhaust. Cesium vapor is ionized by passing it through a heated plate of porous tungsten. An electric or magnetic field accelerates the ions. Shooting out the exhaust at about 300,000 miles an hour, they give the spacecraft its push.

• **Power Source**—Cesium is playing a key role in the development of two Space Age power generation systems, magnetohydrodynamics and thermionic converters.

MHD works on the principle of

utilizing a conducting plasma at high temperatures within a magnetic field to generate electricity. Cesium contributes to ionization of the plasma and lowers the temperature at which the MHD generator can be operated.

A thermionic converter generates electricity by the flow of electrons from a hot surface to a cold one. In principle, it works like a cathode tube. A cathode is heated and throws off electrons to an anode. Cesium acts as one element of a plasma thermocouple. It becomes ionized and provides the electrons with a path between the cathode and anode—much the same way the luminous streak we call lightning is the ionized path for electrons between a charged cloud and earth.

Both systems are in the state of emergence. They are being considered for auxiliary power systems in a number of applications. Spacecraft and remote area power generation are two potentials, says Martin Co., one of the few companies working on MHD and thermionic conversion. The big advantages of both are that they're reliable and require little maintenance.

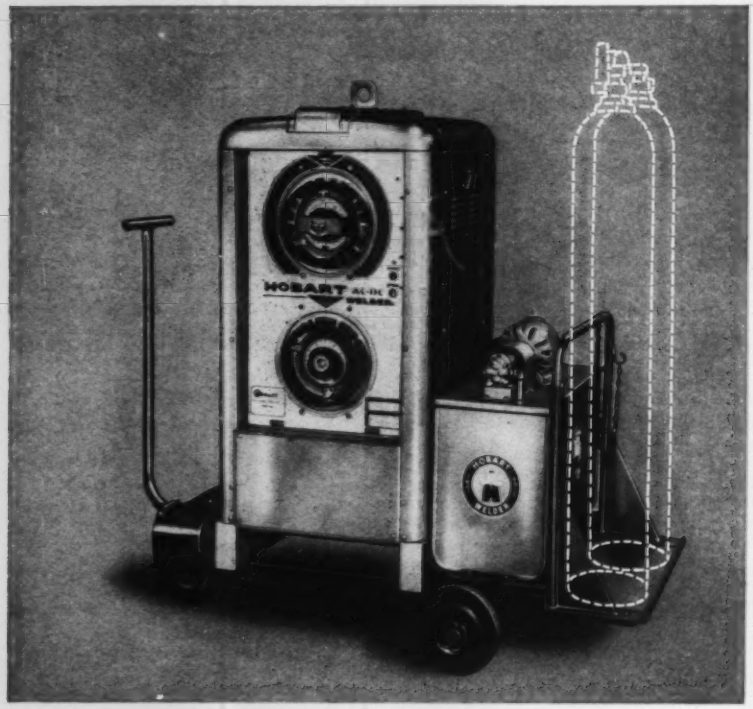
● **Numerous Possibilities** — Martin Co. is doing some work on a cesium maser—an electronic detector used to suppress receiver noise. The metal is also being used in atomic clocks.

Possible is use of the material as a coolant in nuclear reactors. Cesium hydroxide as the electrolyte in alkaline storage batteries, and cesium perchlorate as an additive to solid fuels, are two other potentials. General Electric Co. is working on a cesium vapor lamp that is said to "combine high light output with extremely favorable color quality." Some day, cesium may be needed in large volumes for thermonuclear converters based on plasmas, says U. S. Industrial Chemicals Co., division of National Distillers & Chemical Corp. A real "blue sky" use: Cesium in solar batteries where rays from the sun set up a photoelectric reaction to generate electricity.

● **Current Uses** — No applications for cesium were developed until about 1926. Today, small quantities are going into TV cameras and electron multiplier, photoelectric cells (where cesium is the active agent for conversion of light into electricity). Cesium has been used in infrared lamps, telescopes, binoculars, and spectrometers. Annual U. S. consumption of metallic cesium today is probably no more than 100 lb.

Consumption of cesium salts (carbonate, chloride, hydroxide, fluoride) to date has been more important than use of the metal. Most of the applications are in chemical processing; minute amounts have been used in steel and nonferrous metallurgy (as a scavenger of impurities). Probable yearly consumption of the salts is around 4000 lb.

● **Set to Spurt**—Consumption may jump many thousandfold within the next few years. Forecasts peg usage in ion propulsion alone at 1 million lb annually sometime between 1963 and 1965. By 1970, the ion engine may be consuming 4 million lb yearly. Thermionic conversion is expected to be eventually an even bigger market than the ion engine.



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Producers will be able to supply the increased needs without difficulty, believes Dr. Howard Kremers, district manager of market development for American Potash & Chemical Corp. "Enough reserves are available to take care of any predicted growth over the next decade." The three known cesium deposits—in Manitoba (Canada), Southwest Africa, and Southern Rhodesia—hold about 75,000 tons of contained metal, says F. W. Wessel, cesium commodity specialist at the U. S. Bureau of Mines.

World reserves are probably many times that figure. To date there has been no incentive for exploration. "If a large growth does occur, a lot of people will go out looking for cesium ores," says Dr. Kremers. Most U. S. production in the past came as a byproduct of lithium processing by American Potash.

• **Price High**—The metal is still extremely expensive. Prices vary, depending on the producer and the quantity ordered. About $375 a pound is the average. The price could fall to around $50 a pound when demand exceeds 10,000 lb a year, and eventually could plummet to $5 a pound, producers estimate.

Tin Plate . . .

Tin Plate Prices, Page 150

Producers of tin plate report demand is holding at a steady rate, but they say volume is less than they had anticipated. Mill operations are estimated to be averaging around 75 per cent of capacity.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 149 & 150

Sheet steel business is noticeably better, and deliveries are a little tighter. However, it's still possible to get shipments of hot rolled sheets within two to three weeks, and cold rolled in two to five. Deliveries of galvanized range from mid-October until early November, while enameling stock and electrical sheets are available in four to five weeks.

It's expected deliveries, especially of cold rolled, will lengthen as soon as the auto companies resume heavy buying. Generally, orders are being booked at the best rate in months. A Midwestern mill has enough business to support 75 per cent capacity operation of its cold rolling facilities. That maker is at full production on galvanized sheets.

Tubular Goods . . .

Tubular Goods Prices, Page 154

Commercial pipe demand continues seasonally active, but it's still possible to obtain shipments from stock. Construction accounts for the bulk of merchant pipe movements. In New England, distributors are selling the bulk of tonnage. They are not stocking heavily on buttweld, depending on prompt mill shipments to meet customers' demands.

Utilities are specifying lightly against orders on mill books. They'll not take shipment in normal volume this year.

Stainless tubing orders are up slightly.

Hughes Tool Co.'s survey shows 1882 rotary oil drilling rigs were operating in the U. S. in the latest week of record. That's a gain of 44 from the preceding week and is 214 above the year-ago total.

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With 676 rigs operating, Texas showed a gain of 39 over the week preceding and 114 over a year ago. The Canadian total of 159 for the week showed a gain of 6. The Hughes company reported a rotary rig operating in North Carolina, the first in that state since 1956.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 149

Sustained heavy demand for concrete reinforcing bars is marred by chaotic prices, particularly at the distributor level. Some time ago, several larger producers withdrew published prices, quoting on each job. Even those who haven't officially withdrawn their published quotations are meeting competition. So published mill quotations are largely nominal.

A Midwest producer reports its August shipments of reinforcing bars set a record, and indications point to continued heavy shipments in September and October. It also reported a strong demand for wire mesh.

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Some distributors are booking larger tonnage than others, and for the most part, their heavier backlogs reflect the low prices they quote. Some distributor-fabricators find the price cutting so severe they're not even estimating bridge and public work at some points.

Steel Bars . . .

Bar Prices, Page 148

More active buying of steel bars is reported, but demand is still far from brisk. Hot carbon bars are available for shipment in two to four weeks. Cold finishers are rebuilding their stocks of hot bars—in some cases their inventories are the largest in more than a year. To some extent that reflects price hedging.

The cold finished bar producers are entertaining a little better order volume, including improved buying on government account, some arsenals being in the market. However, defensework hasn't had much impact as yet.

In general, the bulge in bar demand is in line with expectations for September, but volume is heavier than had been anticipated, and some consumers have moved October shipments ahead by one month.

Rails, Cars . . .

Track Material Prices, Page 153

Philadelphia has called for bids on a dozen rail-diesel passenger cars which will be leased to the Reading Co. for service between Philadelphia and Bethlehem, Pa. The contract is expected to be worth about $2.5 million and is described by the city as the first installment of the $6 million of federal funds for railroad cars that it expects to receive through the Housing & Home Finance Agency under the new housing bill.

Distributors . . .

Prices, Page 155

Some distributors' bookings in August were the largest for any month this year. Further gains are expected this month and in October. Plates and galvanized sheets have been active, forcing an extension in deliveries.

Some service centers feel they could adjust prices upward on certain products in the absence of action by producers. Reason: Re-

ductions prompted by competitive conditions.

Distributors of stainless explain some of the recent bitter competition, including price discounting, has resulted from a situation in which supply is ample and demand is below expectations.

July Steel Shipments Top Those in Like 1960 Month

Shipments of finished steel products in July totaled 5,120,808 net tons, down noticeably from the 6,133,519 tons moved in June, reports the American Iron & Steel Institute. The drop was due to the July 4 Holiday and vacation schedules. Despite the drop, the tonnage shipped was nearly 9 per cent greater than the 4,710,565 tons moved in July a year ago.

The principal products shipped in the month included: Cold rolled sheets 860,997 tons; hot rolled sheets 514,002; hot rolled bars 479,850; electrolytic tin plate 473,506; and plates 450,842.

Major market groups receiving direct mill shipments during July were: Distributors 1,023,851 tons; automotive industry 848,969; construction 778,601; containers 582,406; and contractors' products 345,724.

Through the first seven months this year the mills shipped nearly 36.4 million net tons of finished products vs. 47.6 million tons in the like 1960 period.

Wire . . .

Wire Prices, Pages 150 & 153

Merchant wire products continue in easy supply, deliveries ranging from stock to one week. Manufacturers' wire is tighter; shipments extend one to five weeks, depending on processing.

Industrial grades of carbon wire are more active, notably round and flat spring wire. Volume is not heavy because buying is at a low level. Prompt shipments are wanted in some cases. Producers, in scheduling orders, usually engage capacity to avoid overtime. One New England specialty mill is operating at 70 per cent of capacity, about 10 points above the average for the industry.

August shipments of manufacturers wire by a Midwestern producer were up for the second straight month. Further gains are anticipated this month. The mill is operating between 70 and 80 per cent of capacity. It is shipping heavier tonnage to furniture makers and is anticipating a strong buying movement in auto seat wire for the new model cars.

Plates . . .

Plate Prices, Page 148

Slightly heavier plate orders are reported in the South, Midwest, and East. The improvement was first noticeable in the Midwest but has spread fairly rapidly. There has not been any big buildup of backlogs anywhere, but buying volume is better as fabricating shops take on more work and begin to replenish depleted inventories in a limited way.

Prompt mill shipments still discourage heavy forward buying, though there are some indications that delivery extensions may not be far off. It's still possible to obtain sheared plates within a couple of

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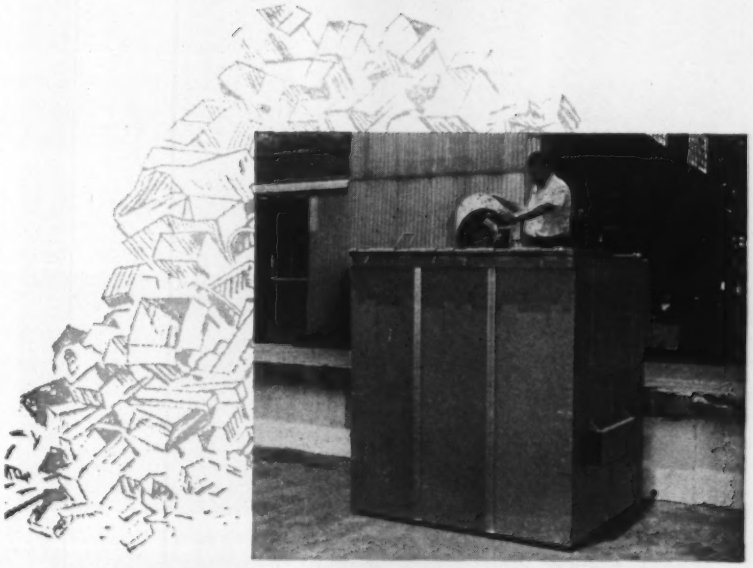

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Dept. S-92, KNOXVILLE 17, TENNESSEE

weeks, but some producers can't promise any tonnage under three to five weeks, and on universal plate, under three to four weeks. Alloy plate deliveries hold around four to five weeks.

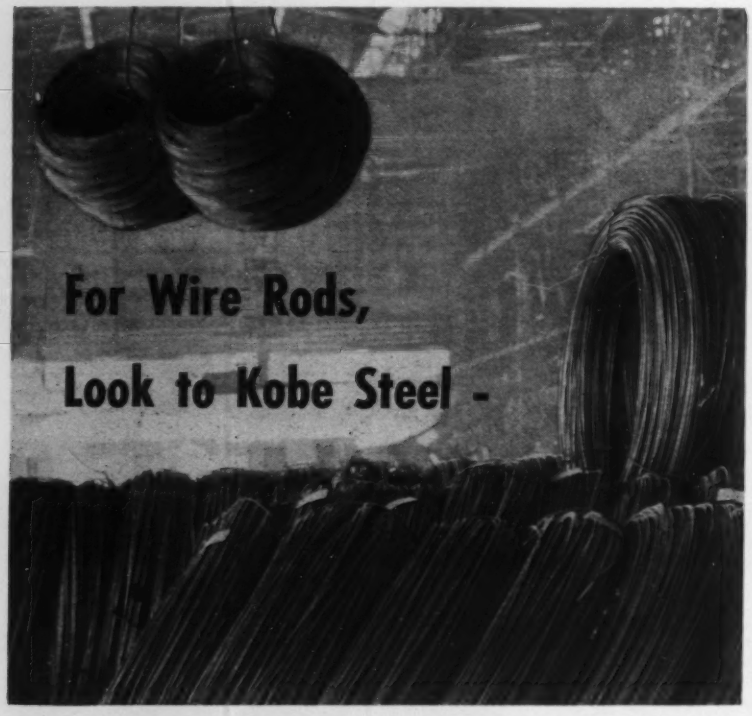
The Mare Island (Calif.) Navy Yard closes bids Sept. 20 on 32, large, elliptical, dished alloy heads.

Sun Shipbuilding & Dry Dock Co., Chester, Pa., has been awarded a $1.6 million contract for the overhaul of the Navy munitions ships, *Mauna Loa* and *Mazama*.

Missile, Aircraft Orders Are Placed by the Navy

Aircraft, missile, and electronics contracts totaling $73.8 million have been placed by the Navy, it was announced last week. Martin Co. booked a $16,103,259 contract for Bullpup air-to-ground missiles. Another contract totaling $15,995,000 went to Sikorsky Aircraft Div., United Aircraft Corp., for additional procurement of helicopters.

Other contracts were: Lockheed Aircraft Corp., $10,625,636 for aircraft; Goodyear Aircraft Corp., $9,223,331 for underwater missile components; Hughes Aircraft Co., $12,758,000 for airborne electronics gear; Hiller Aircraft Corp., $6,639,880 for light, utility helicopters; Westinghouse Electric Corp., $2,460,880, for flight and laboratory tests of radar sets.



With 35 years of experience in the production of low carbon steel wire rods, and a proud record of being the first to produce high carbon steel wire rods in Japan over 30 years ago.

Kobe Steel, with the complesion of its new No. 5 mill in June of 1961, now has production capacity of 740,000 tons annually and is known as the oldest, largest and most versatile manufacturer of steel wire rods in the Far East.

Particularly famous for the high quality of its high carbon, alloy and stainless steel wire rods, Kobe Steel exports to every major area of the world.

KOBE STEEL WORKS, LTD.

Head Office: Kobe, Japan Cable: "KOBESTEEL KOBE"
New York Office: 80 Pine St., New York 5, N.Y., U.S.A.
Düsseldorf Office: Immermann St., 10, Düsseldorf, West Germany

Main Products: Wire Rods — High and Low Carbon Steel, Alloy and Stainless Steel
Wire Products · Bars, Pipes and Tubes · Arc Welding Electrodes · General Machinery

Structural Shapes . . .

Structural Shape Prices, Page 148

Although demand for structural steel is less active than it was a couple of weeks ago, considerable work is still being figured, and moderate tonnage is being placed. Public work dominates, but there's a fair sprinkling of commercial and industrial projects before the market.

Contractors are shopping for low prices with competition among fabricators keen. About 5000 tons are pending for bridges in New England; also, a substantial tonnage of bearing piles in Rhode Island. Some 2000 tons of structurals are out for bids for Bonneville Power Administration transmission towers.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, 20 story office building, Spring Mills Inc., 109 W. 39th St., New York, through George A. Fuller Co. to American Bridge Div., U. S. Steel Corp., Pittsburgh.

1618 tons, state bridgework, Route 80, Sec. 5B, New Jersey, through Poirier & McLane Corp. to American Bridge Div., U. S. Steel Corp., Pittsburgh.

1183 tons, state bridgework, Route 287, Sec. 3-B, Middlesex County, New Jersey, through Public Constructors, Blackwood, N. J., general contractor, to American Bridge Div., Pittsburgh, U. S. Steel Corp.

1020 tons, National Maritime Union headquarters, 13th St. and 7th Ave., New York, through J. Alexander Stein Co. to Ingalls Iron Works, Birmingham.

1000 tons, addition, St. Vincent's Hospital, New York, to Grand Iron Works, Bronx, New York.

595 tons, steam plant, Paradise, Ky., to Mississippi Valley Structural Steel Co., Chattanooga, Tenn.; steel decking and metal siding to H. H. Robertson Co., Birmingham, $621,036; Tennessee Valley Authority project.

400 tons, Maxwell House Div., General Foods Corp., Hoboken, N. J., to Elizabeth Iron Works Inc., Union, N. J.

250 tons, Ross Warehouse, Vancouver, Wash., to Portland Iron & Wire Co., Portland, Oreg.; A. R. Nieman, Vancouver, general contractor for the Bonneville Power Administration, Portland.

250 tons, including reinforcing bars, junior high school, Wallingford, Conn., to Connecticut Steel Co., New Haven, Conn. (structurals) and Capitol Steel Corp., New York (reinforcing bars); P. Francini Co. Inc., Derby, Conn., general contractor.

200 tons, John W. Foster Residence Center, University of Indiana, Bloomington, Ind., to Hetherington-Burner Co., Bloomington; H. C. Beck Co., Atlanta, Ga., general contractor.

174 tons, state highway bridge (stringer), East Boston, Mass., to West End Iron Works, Cambridge, Mass.; Munroe-Langstroth Inc., Norwood, Mass., general contractor; also,

43 tons of concrete reinforcing bars to Truscon Steel Div., Youngstown, Republic Steel Corp.

170 tons, novitiate, Sisters of Our Lady of Providence, Portsmouth, R. I., to Builders' Iron Works, Somerville, Mass.; J. L. Marshall & Sons Inc., Pawtucket, R. I., general contractor; also, 85 tons of concrete reinforcing bars to Plantations Steel Co., Providence, R. I.

156 tons, state highway structures, Sullivan and Ulster Counties, New York, FARC 61-93, to City Iron Works, Hartford, Conn.; Lane Construction Co., Meriden, Conn., general contractor.

154 tons, state highway bridge, Southbury, Conn., Proj. 130-92, to McDermott Steel Specialties Inc., New Haven, Conn.; Charter Oak Construction Co., Hartford, Conn., general contractor.

135 tons, also 100 tons of reinforcing bars, Washington State highway crossing, Clark County, to Poole, McGonigle & Dick, Portland, Oreg; Max J. Kuney Co., Spokane, Wash., general contractor.

132 tons, heating plant, Hartford, Conn., to National Steel Fabricators, Newington, Conn.; F. H. McGraw Co., Hartford, general contractor.

125 tons, bridge crane for Tennessee Power Administration to Star Iron & Steel Co., Tacoma, Wash.

125 tons, Spokane, Wash., high school, to unstated interest; Selkirk Construction Co., Spokane, general contractor.

125 tons, miscellaneous, Century 21 Exposition construction, Seattle, to Century Metal Works Inc., Seattle.

STRUCTURAL STEEL PENDING

1993 tons, state bridgework, Niagara County, New York; A. Ottaviano, Croton-on-Hudson, N. Y., low on the general contract.

1000 tons, state interchange, Baltimore; bids closed Sept. 13.

655 tons, Southern Railway bridge, Tateville, Ky.; bids closed.

600 tons, 12 story apartment, Realty Equities Corp., East 67th St., New York, pending.

360 tons, state bridgework, SPC 6607, Niagara County, New York; Bates & Rogers Construction Corp., Chicago, low on the general contract.

308 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia; bids Sept. 25.

210 tons, two beam bridges, Windham-Derry, N. H., including 92 tons of concrete reinforcing bars; bids Sept. 21, Concord, N. H.

205 tons, angles, Grade M, type A, Military Industrial Supply Agency, Navy, Philadelphia; also, 139 tons setaside for small business; bids Sept. 18; 155 tons of alloy steel bars also required.

195 tons, office and warehouse, A.G.F.A. Inc., Rockleigh, N. J.

173 tons, state highway bridge, Warren, Maine; also, 38 tons of concrete reinforcing bars; Ross Construction Co. Inc., Augusta, Maine, low on the general contract.

138 tons, state highway bridge, U. S. Route No. 2, Bethel, Maine; H. E. Sargent Inc., Stillwater, Maine, general contractor.

155 tons, state highway bridges, FISH 61-17, Onondaga County, New York; S. J. Groves & Co., low on the general contract.

150 tons, one, 3 span and one, 2 span, composite wide flange beam bridges, U. S. Route 4, Bridgewater, Vt.; also, 70 tons of concrete reinforcing steel bars.

147 tons, two span girder bridge, Hartford, Conn.; bids Sept. 18 to Hartford; also required, 437 tons of concrete reinforcing steel bars and 807 tons of steel piles.

135 tons, also 100 tons of reinforcing steel, Washington State highway overcrossing, Vancouver; general contract to Max J. Kuney Co., Spokane, Wash., low at $226,379.

127 tons, state bridgework, U. S. Route 130, Sec. 7C and 9C, Camden County, New Jersey; F. A. Canuso, Camden, N. J., low on the general contract.

126 tons, state highway bridge over New Haven Railroad, Groton, Conn.; including 44 tons of concrete reinforcing bars; bids Sept. 25, Hartford, Conn.

116 tons, high tensile, Navy Purchasing Office, Washington, D. C., delivery to Mare Island Navy Yard, California.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1154 tons, John W. Foster Residence Center, University of Indiana, Bloomington, Ind., to Pollak Steel Co., Cincinnati; H. C. Beck Co., Atlanta, Ga., general contractor.

386 tons, Yakima, Wash., courthouse, to Pacific Coast Div., Seattle, Bethlehem Steel Co.; W. M. Yeaman Construction Co., Yakima, general contractor.

200 tons, Washington State highway span, Whatcom County, to Northwest Steel Rolling Mills Inc., Seattle; Peter Kiewit & Sons Co., Seattle, general contractor.

135 tons, Washington State; Cedar River bridge, King County, to J. D. English Steel Co., Tacoma, Wash.; Earley Construction Co., Tacoma, general contractor.

REINFORCING BARS PENDING

1000 tons plus, Canyon Dam near Dillon, Mont.; Emil Anderson Construction Co. Ltd. and two associates, Vancouver, B. C., low at $3,347,402 to the Bureau of Reclamation, Dillon.

975 tons, also 35 tons of shapes, Roanoke Expressway, Seattle; bids to the State Highway Department, Olympia, Wash., Sept. 26.

836 tons, state bridgework, Allegheny County, Pennsylvania, bids Sept. 29; 971 tons of structural steel are also required.

700 tons, Barratts diversion dam, near Dillon, Mont.; Zook Bros. Construction Co. and Lewis Construction Co., Great Falls, Mont., joint low to the Bureau of Reclamation at $1,919,987 and $532,975 on two schedules.

500 tons, addition to Swedish Hospital, Seattle; a $3.2 million project; bids taken Sept. 21.

500 tons, four-story, municipal parking facility, Seattle; Howard S. Wright Construction Co., Seattle, low at $1,339,000.

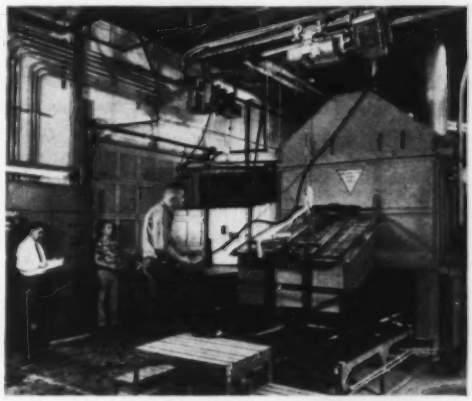
386 tons, courthouse, Yakima, Wash.; general contract to W. M. Yeaman Construction Co., Yakima, low at $1,190,717.

327 tons, state bridgework, Cumberland County, Pennsylvania; bids Sept. 29.

302 tons, Northumberland-Montour Counties, Pennsylvania, bids Sept. 29.

275 tons, flood control project, Snohomish County, Washington; Wayne Construction Co. Inc., Seattle, low at $1,026,000 to French

NEW DESPATCH FURNACE USED TO PRODUCE REVOLUTIONARY BATTERY



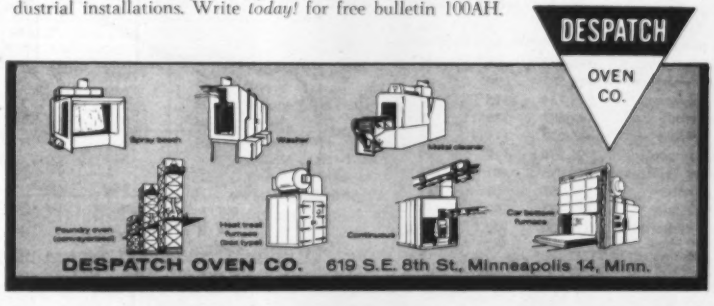
Twin City Manufacturer Makes New Electrodes With Secret Heat Process

A specially designed new high-temperature Despatch furnace is helping a St. Paul firm produce a revolutionary sealed and rechargeable nickel-cadmium battery. Details of performance are still confidential, but officials of Nicad Sealed Cell Division, Gould-National Batteries, Inc., report results are "very satisfactory."

Electrically heated, the furnace is electronically controlled, has a pneumatically operated vertical-lift door, and is lined with special steel. Processing "thousands per hour" of special electrodes produces corrosive gases which would destroy conventional units, the firm stated.

Despatch was chosen to produce the furnace because of "good success" the company has had with previous Despatch installations. Company officials praised performance, economy of operation and durability.

Despatch engineers can solve your firm's special problems, too. Take advantage of the skills developed from tens of thousands of industrial installations. Write *today!* for free bulletin 100AH.



DESPATCH—INDUSTRY LEADERS FOR 58 YEARS

Slough District; 2415 sq ft of sheet piling also involved.

210 tons, Washington State, two girder bridges, Pierce County; Woodworth & Co., Tacoma, Wash., awarded at $246,981.

160 tons, repairs to Alki seawall, Seattle; Wayne Construction Co., Seattle, low bidder.

PLATES . . .

PLATES PLACED

600 tons, 24 and 30 in. pipe caissons, University Teaching Hospital, Syracuse, N. Y., to Armco Steel Corp., Middletown, Ohio.

PLATES PENDING

110 tons, floor plates, Military Industrial Supply Agency, Navy, Philadelphia; bids Sept. 25; also, 87 tons of aluminum alloy floor plate, bids Sept. 22.

100 tons, seven tanks, Heyden Newport Chemical Co., Houston, Lummus Co., New York, engineer and constructor.

PIPE . . .

CAST IRON PIPE PLACED

160 tons, 4 to 12 in., King County District No. 66, to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

140 tons, 10 in., Bellingham, Wash.; bids in.

STEEL PIPE PENDING

Unstated, 10,000 ft of electricweld; bids to Port Townsend, Wash., Sept. 19.

RAILS, CARS . . .

RAILROAD CARS PLACED

North American Car Corp., fifty, 89 ft, piggyback flatcars, to American Car & Foundry Div., ACF Industries Inc., New York; cars will be used for leasing.

RAILS PENDING

125 tons, 2800 ft of 90 lb, new steel; also, same quantity of used rail, rail hardware, etc.; bids to the Port of Seattle, Sept. 21.

Steelmaking Operations Continue to Climb Slowly

THE UPSWING in steelmaking operations is being slowed down by the auto labor situation. But scattered auto plant closings have been largely counteracted by gains in demand from several other large consuming industries. Although some steel producers report larger bookings, they are avoiding any substantial boost in production schedules until they are sure there won't be a prolonged automotive strike and that business will continue to improve.

STEEL estimates production for the week ended Sept. 16 at 2,050,000 tons, a gain of 0.9 per cent over the 2,032,000 tons in the week ended Sept. 9.

• **Youngstown**—The district operating rate held at about 66 per cent of 1960 capacity during the week ended Sept. 16. Youngstown Sheet & Tube Co. expects to close down one of the open hearths at its Campbell (Ohio) Works for relining. But if demand for steel continues to improve, the company may relight a smaller furnace at the Brier Hill Works.

• **Buffalo**—Steel output in this area is forging ahead again as a result of lighting of two more open hearths at the Lackawanna, N. Y., plant of Bethlehem Steel Co. The district rate advanced to about 61 per cent of 1960 capacity for the week ended Sept. 16 from about 58.5 per cent the preceding week.

• **Los Angeles**—Demand for steel has registered the start of its predicted climb, boosting the operating rate for the Western District to an estimated 78 per cent of 1960 capacity for the week ended Sept. 16—a gain of 6 points for that period.

• **Birmingham** — The steelmaking rate for the Birmingham-Gadsden-Atlanta area of the Southern district rose 2½ points during the week ended Sept. 16 to 72 per cent of 1960 capacity.

• **Philadelphia**—Steel output in the Northeastern district held fairly steady during the week ended Sept. 16. The AISI index was 115 in the week ended Sept. 9.

• **Chicago**—Steelmaking held unchanged in this district at 74 per cent of 1960 capacity during the week ended Sept. 16. Small gains in output at several mills were offset by minor dips in others.

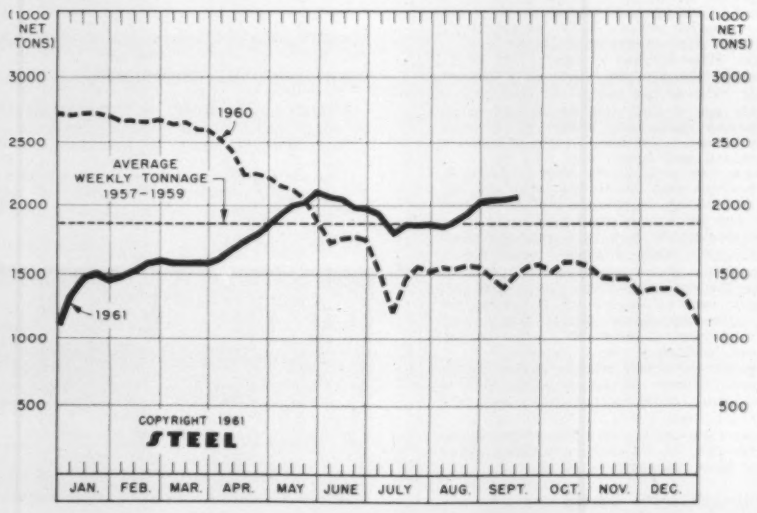
• **Cincinnati** — Production in the week ended Sept. 16 is estimated at about 88,400 tons, off somewhat from the 91,994 tons for the week ended Sept. 9. One district producer forecast a 5000 ton drop in production due to furnace repairs. A gain in output was expected at other mills.

STEEL INGOT PRODUCTION

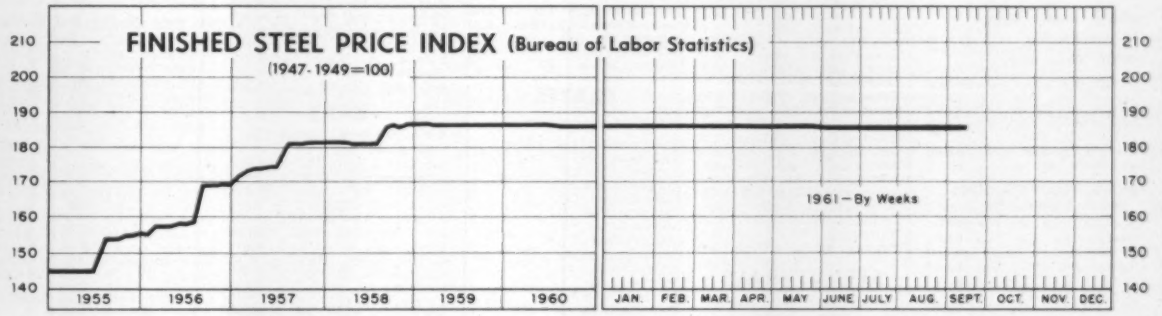
Weeks Ended	Net Tons	Change
Sept. 16	2,050,000*	+ 0.9%
Sept. 9	2,032,000	+ 0.1%
Sept. 2	2,030,000	+ 0.5%
Totals to Sept. 9		
1961	64,172,000	—14.6%
1960	75,186,000	

DISTRICTS	Week Ended —Sept. 9— Tons‡	Index†	Week Ended Sept. 2 Index†
Northeastern	307,275	115	114
Buffalo	97,355	100	96
Pittsburgh	395,478	98	101
Youngstown	166,581	98	92
Cleveland	115,744	125	123
Detroit	142,687	136	132
Chicago	415,224	111	108
Cincinnati	91,994	122	119
St. Louis	53,076	101	119
Southern	117,068	108	111
Western	127,435	109	118
Industry	2,032,000	109.1	109.0

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Sept. 12, 1961	Week Ago	Month Ago	Aug. Index	Year Ago
185.6	185.6	185.6	185.6	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 12

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	(N.A.)
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.423
		Casing, Oil Well, Carbon (100 ft)	193.028
		Casing, Oil Well, Alloy (100 ft)	302.645
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	192.285
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Sept. 13 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	225.71
Index in cents per lb	6.713	6.713	6.713	6.713	6.114

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$137.75
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	62.63
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	62.18
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	63.41
Steelmaking Scrap, GT	39.83	39.50	38.33	32.33	59.67

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 13 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	5.075
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	5.075
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.85
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	5.00
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	5.00
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.85
Plates, Chicago	5.30	5.30	5.30	5.30	4.85
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	5.25
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.85
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.75-5.85
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	6.30
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.95
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	7.20
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	8.35
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$91.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.80

PIG IRON, Gross Ton	Sept. 13 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$63.50
Basic, Valley	66.00	66.00	66.00	66.00	62.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	59.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	66.70
Malleable, Valley	66.50	66.50	66.50	66.50	63.00
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$37.50	$37.50	$35.50	$30.50	$58.50
No. 1 Heavy Melt, E. Pa.	40.50	40.50	40.00	35.00	59.00
No. 1 Heavy Melt, Chicago	41.50	40.50	39.50	31.50	61.50
No. 1 Heavy Melt, Valley	42.50	41.50	39.50	33.50	65.50
No. 1 Heavy Melt, Cleve.	38.50	38.50	36.50	31.50	63.00
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	29.50	56.50
Rails, Rerolling, Chicago	61.50	61.50	58.50	53.50	84.50
No. 1 Cast, Chicago	43.50	43.50	42.50	40.50	53.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.50
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	17.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	29.50

Steel Prices

Mill base prices as reported to STEEL, Sept. 13, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 149; footnotes, page 153.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5 ..... $76.00

INGOT, Alloy (NT)

Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4 ..... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 ..... 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 ..... 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 ..... 99.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 ..... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. C8 ..... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 ..... 99.50
S.Duquesne,Pa. U5 ..... 99.50
S.SanFrancisco B3 ..... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $119.00
Bridgeport,Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 ..... 119.00
Conshohocken,Pa. A3 ..... 121.00
Detroit S41 ..... 119.00
Economy,Pa. B14 ..... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 ..... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ..... 119.00
Johnstown,Pa. B2 ..... 119.00
Lackawanna,N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 ..... 119.00
Seattle(6) B3 ..... 140.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 ..... 119.00
S.Duquesne,Pa. U5 ..... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2,W14 ..... 122.50
S.Duquesne,Pa. U5 ..... 122.50
Warren,O. C17 ..... 122.50

SKELP

Aliquippa,Pa. J5 ..... 5.05
Benwood,W.Va. W10 ..... 5.05
Ind.Harbor,Ind. Y1 ..... 5.05
Munhall,Pa. P5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS

AlabamaCity,Ala. R2 ..... 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 ..... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 ..... 6.65
Monessen,Pa. P7 ..... 6.40
N.Tonawanda S47 ..... 6.40
Pittsburg,Calif. C11 ..... 7.20
Portsmouth,O. P12 ..... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 ..... 6.40
SparrowsPoint,Md. B2 ..... 6.50
Sterling,Ill.(1) N15 ..... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.80
Ind.Harbor,Ind. I-2, Y1 ..... 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 ..... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 ..... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 ..... 5.50
S.SanFrancisco B3 ..... 6.15
Sterling,Ill. N15 ..... 5.50
Struthers,O. Y1 ..... 5.50
Torrance,Calif. C11 ..... 6.20
Weirton,W.Va. W6 ..... 5.50

Wide Flange

Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 ..... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N5 ..... 5.50
Weirton,W.Va. W6 ..... 5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 ..... 6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 ..... 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 ..... 8.15
Lackawanna,N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Phoenixville,Pa. P4 ..... 8.10
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 ..... 8.05
S.SanFrancisco B3 ..... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 ..... 8.05
Lackawanna,N.Y. B2 ..... 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 6.50
Lackawanna,N.Y. B2 ..... 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 ..... 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ..... 5.30
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. P4 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 ..... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 ..... 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 ..... 5.40
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 ..... 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 ..... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 ..... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B2 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 ..... 5.30
SparrowsPoint,Md. B2 ..... 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 ..... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown(27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 ..... 7.05

PLATES, Wrought Iron

Economy,Pa. B14 ..... 14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. P4 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 ..... 7.95
Conshohocken,Pa. A3 ..... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 ..... 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 ..... 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 ..... 7.95
SparrowsPoint,Md. B2 ..... 7.95
Sterling,Ill. N15 ..... 7.625
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, Alloy

Claymont,Del. P4 ..... 7.50
Coatesville,Pa. L7 ..... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 ..... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 ..... 7.50
SparrowsPoint,Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..... 5.55
Ashland l.c.l.(15) A10 ..... 6.05
Cleveland c.l. R22 ..... 6.05
Warren,O. R2 ..... 6.05

FLOOR PLATES

Cleveland J5 ..... 6.375
Claymont,Del. P4 ..... 6.375
Conshohocken,Pa. A3 ..... 6.375
Ind.Harbor,Ind. I-2 ..... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..... 5.675
Aliquippa,Pa.(9) J5 ..... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 ..... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 ..... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 ..... 5.675
Emeryville,Calif. J7 ..... 6.425
Fairfield,Ala.(9) T2 ..... 5.675
Fairless,Pa.(9) U5 ..... 5.825
Fontana,Calif.(9) K1 ..... 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 ..... 5.675
Johnstown,Pa.(9) B2 ..... 5.675
Joliet,Ill. P2 ..... 5.675
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
LosAngeles(9) B3 ..... 6.375
Massillon,O.(23) R2 ..... 6.15
Midland,Pa.(23) C18 ..... 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
N.Tonawanda S47 ..... 5.675
Owensboro,Ky.(9) G8 ..... 6.025
Pittsburg,Calif.(9) C11 ..... 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
Riverdale,Ill.(9) A1 ..... 5.675
Seattle(9) A24,B3,N15 ..... 6.425
S.Ch'c'go(9)R2,U5,W14 ..... 5.675
S.Duquesne,Pa.(9) U5 ..... 5.675
S.SanFran.,Calif.(9) B3 ..... 6.425
Sterling,Ill.(1)(9) N15 ..... 5.675
Sterling,Ill.(9) N15 ..... 5.775
Struthers,O.(9) Y1 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675
Torrance,Calif.(9) C11 ..... 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5 ..... 5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 ..... 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 ..... 6.975
Lackawanna,N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
N.Tonawanda S47 ..... 6.725
Owensboro,Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle(6) B3 ..... 7.825
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 ..... 6.725
S.Duquesne,Pa. U5 ..... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 ..... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 ..... 8.55
Lackawanna,N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 ..... 8.30
S.Duquesne,Pa. U5 ..... 8.30
S.SanFrancisco B3 ..... 9.05
Sterling,Ill. N15 ..... 7.925
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..... 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 ..... 16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded (Including loaded extra)

Carbon

LosAngeles P2, S30 ..... 11.75*

Alloy

Ambridge,Pa. W18 ..... 10.175
BeaverFalls,Pa. M12 ..... 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 ..... 7.65
Birmingham C15 ..... 8.10
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, H5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 ..... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 ..... 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 ..... 9.10
LosAngeles(49) P2, R2 ..... 9.10
Mansfield,Mass. B5 ..... 8.20
Massillon,O. R2, R8 ..... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.16
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 ..... 7.90
Putnam,Conn. W18 ..... 8.20
Readville,Mass. C14 ..... 8.20
Seattle(49) S30 ..... 9.10
S.Chicago,Ill. W14 ..... 7.65
SpringCity,Pa. K3 ..... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 9.025
BeaverFalls,Pa. M12,R2 ..... 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 ..... 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.25
Detroit B5, P17 ..... 9.225
Detroit H5, S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark, Ill. N5 ..... 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025

Hammond,Ind. J5, L2. .9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
N.Tonawanda S47 ....9.025
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
Seattle A24, B3, N14...6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.6.5
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ...7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks.(D.R.) L5 ...20.50
McK.Rks.(DirRolled)L5 13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.20
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2...5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 .....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1.....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	...7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	...7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	..7.225	7.425
Irvin,Pa. U5	....7.125	7.375
Kokomo,Ind. C16	.7.325	....
MartinsFry. W10	.7.125	7.375
Pitts Calif. C11	..7.875	....
Pittsburgh J5	...7.225	....
SparrowsPt. B2	..7.225	....
Weirton W6	.....7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1.....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped‡

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 .....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.H'rb'r,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Corp.

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5, Y1	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2,Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.425
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.425
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M23	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Riverdale,Ill. A1	7.425
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975
Youngstown Y1	7.425
Youngstown S41	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. S8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M23	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Basis Weight 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Electrolytic 0.25 lb (100 lb basis wt) Coating

Aliquippa,Pa. J5	$9.10
Fairfield,Ala. T2	9.10
Fairless,Pa. U5	9.10
Fontana,Calif. K1	9.75
Gary,Ind. U5	9.10
GraniteCity,Ill. G4	9.20
Ind.Harb.,Ind. I-2, Y1	9.10
Irvin,Pa. U5	9.10
Niles,O. R2	9.10
Pittsburg,Calif. C11	9.75
SparrowsPt.,Md. B2	9.10
Weirton,W.Va. W6	9.10
Yorkville,O. W10	9.10

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.20
Fairless,Pa. U5	8.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

ELECTRO. TIN-COATED SHEET (20-27 gage; per 100 lb)

IndianaHarb.,Ind. Y1	$7.90

(21-27 gage; per 100 lb)

Aliquippa,Pa. J5	$7.90
Niles,O. R2	7.90

TIN PLATE, HOT DIPPED COMMON COKE 1.25 lb 1.50 lb

Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

HOLLOWARE ENAMELING (Black plate) (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875*	11.70	12.40	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coil's & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
N.Tonawanda S47	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00
N.Tonawanda S47	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa.(10) B2	12.65
KansasCity,Mo. U3	12.90
LosAngeles(2) B3	13.60
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md.(10) B2	12.75
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.075
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.075
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.20
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.20
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.20
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ill. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S41	13.45
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

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Two transfer cranes, one with a lift section, and connecting spur tracks interlock the entire area into a smoothly operating, trouble-free materials handling unit. No manual, time consuming re-handling of material is required. The product is always ON TRACK with Trambeam.

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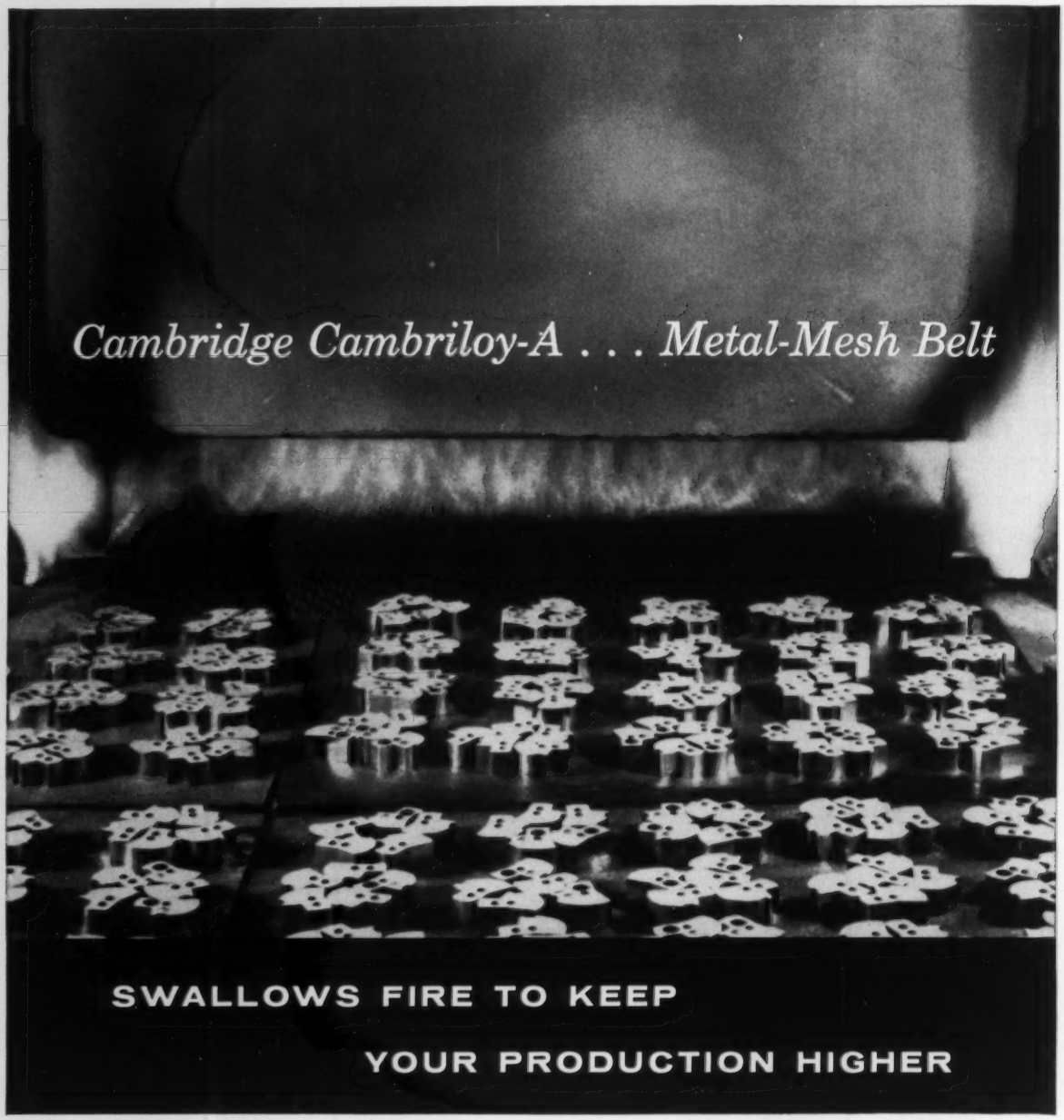

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Department J • Cambridge 9, Md.

Manufacturers of Metal-Mesh Conveyor Belts, Flat Wire Conveyor Belts, Wire Cloth, Wire Cloth Fabrications, Gripper ® Metal-Mesh Slings

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	....17.15
Roebling,N.J. R5	....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....12.35
Baltimore T6	.....12.65
Boston T6	.....12.65
Buffalo W12	.....12.35
Chicago W13	.....12.45
Cleveland A7	.....12.35
Crawfordsville,Ind. M8	.12.35
Dover,O. G6	.....12.35
Evanston,Ill. M22	....12.45
Farrell,Pa. S3	.....12.35
Fostoria,O. S1	.....12.35
FranklinPark,Ill. T6	..12.45
Kokomo,Ind. C16	....12.35
Massillon,O. R8	.....12.35
Milwaukee C23	.....12.55
Monessen,Pa. P7, P16.	.12.35
NewCastle,Pa. M23	....12.35
Palmer,Mass. W12	....12.65
Pawtucket,R.I. N8	....12.65
Philadelphia P24	....12.65
Riverdale,Ill. A1	.....12.45
Rome,N.Y. R6	.....12.35
Sharon,Pa. S3	.....12.35
Trenton,N.J. R5	.....12.65
Warren,O. B9	.....12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes — **Col.**

AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	...175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	...$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10.	.$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
Sparrows Pt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	..$8.78
Atlanta A11	.....10.36
Bartonville,Ill. K4	....8.88
Buffalo W12	.....10.26
Chicago W13	.....9.24
Crawfordsville,Ind. M8	..8.88
Donora,Pa. A7	.....8.78
Duluth A7	.....8.78
Fairfield,Ala. T2	.....8.78
Houston S5	.....9.02
Jacksonville,Fla. M8	..8.88
Johnstown,Pa. B2	.....8.78
Joliet,Ill. A7	.....8.78
KansasCity,Mo. S5	....9.02
Kokomo,Ind. C16	.....8.88
LosAngeles B3	.....9.20
Minnequa,Colo. C10	....8.02
Pittsburg,Calif. C11	....9.20
S.Chicago,Ill. R2	.....8.78
S.SanFrancisco C10	....9.20
SparrowsPt.,Md. B2	....8.88
Sterling,Ill.(37) N15	....8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	..$9.06
Atlanta A11	.....10.70
Bartonville,Ill. K4	.....9.16
Buffalo W12	.....10.60
Chicago W13	.....9.54
Crawfordsville,Ind. M8	..9.16
Donora,Pa. A7	.....9.06
Duluth A7	.....9.06
Fairfield,Ala. T2	.....9.06
Houston S5	.....9.30
Jacksonville,Fla. M8	..9.16
Johnstown,Pa. B2	.....9.06
Joliet,Ill. A7	.....9.06
KansasCity,Mo. S5	....9.30
Kokomo,Ind. C16	.....9.16
LosAngeles B3	.....9.50
Minnequa,Colo. C10	....9.30
Pittsburg,Calif. C11	....9.50
S.Chicago,Ill. R2	.....9.06
S.SanFrancisco C10	....9.50
SparrowsPt.,Md. B2	....9.16
Sterling,Ill.(37) N15	....9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2.	.$9.11
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....9.21
Buffalo W12	.....10.65
Chicago W13	.....9.59
Crawfordsville,Ind. M8.	9.21
Donora,Pa. A7	.....9.11
Duluth A7	.....9.11
Fairfield,Ala. T2	.....9.11
Houston S5	.....9.35
Jacksonville,Fla. M8	..9.21
Johnstown,Pa. B2	.....9.11
Joliet,Ill. A7	.....9.11
KansasCity,Mo. S5	....9.35
Kokomo,Ind. C16	.....9.21
LosAngeles B3	.....9.55
Minnequa,Colo. C10	....9.35
Pittsburg,Calif. C11	....9.55
S.Chicago,Ill. R2	.....9.11
S.SanFrancisco C10	....9.55
SparrowsPt.,Md. B2	....9.21
Sterling,Ill.(37) N15	....9.21

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	...212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	...198**
Monessen,Pa. P7	.....196§
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	..17.85	19.65
Bartonville K4	..17.95	19.80
Chicago W13	....17.85	....
Cleveland A7	...17.85	....
Craw'sville M8	.17.95	19.80†‡
Fostoria,O. S1	..18.35	19.90†
Houston S5	....18.10	19.65**
Jacksonville M8	17.95	19.80†‡
Johnstown B2	..17.85	19.65§
Kan.City,Mo. S5.	.18.10	....
Kokomo C16	...17.95	19.50†
Minnequa C10.	.18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	.17.95	19.75§
St'ling(37) N15	..17.95	19.80
Waukegan A7	..17.85	19.40†
Worcester A7	....18.15	....

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2..	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	...177

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	.....187**
Aliq'ppa,Pa.9-11½Ga.J5	190§
Atlanta A11	.....191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2.	.190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A1	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

	6 to 8 gage	An'ld	Galv.
Ala.City,Ala. R2	.9.00	9.55**	
Aliquippa J5	....8.65	9.325§	
Atlanta(48) A11	..9.00	9.75*	
Bartonville(48) K4	9.10	9.85	
Buffalo W12	.....9.00	9.55†	
Chicago W13	....9.00	9.55**	
Cleveland A7	.....9.00	....	
CrawfordsvilleM8	9.10	9.80††	
Donora,Pa. A7	..9.00	9.55†	
Duluth A7	.....9.00	9.55†	
Fairfield T2	.....9.00	9.55	
Houston(48) S5	..9.25	9.80**	
Jack'vill,Fla. M8	9.10	9.80†‡	
Johnstown(48) B2	9.00	9.675§	
Joliet,Ill. A7	....9.00	9.55†	
KansasCity(48)S5	9.25	9.80**	
Kokomo(48) S16	..9.10	9.65†	
LosAngeles B3.	.9.95	10.625§	
Minnequa C10	...9.25	9.80**	
Monessen(48) P7.	.8.65	9.35§	
Palmer,Mass. W12	9.30	9.85†	
Pitts.,Calif. C11.	.9.95	10.50†	
Rankin,Pa. A7	...9.00	9.55†	
S.Chicago R2	....9.00	9.55**	
S.SanFran. C10.	.9.95	10.50**	
Spar'wsPt.(48)B2	9.10	9.775§	
St'ling(37)(48)N15	9.10	9.80	
Struthers,O. Y1	...9.00	9.65‡	
Worcester,Mass.A7	9.30	9.85†	

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

FASTENERS

SCREWS, NUTS, BOLTS

(Consumer discounts per cent off list prices, plain finishes. For less than full container quantities, add 25 per cent; attaching nuts to bolts in sizes ¼ in. through ⅝ in. diameter through 8 in. in length, price on application. Discounts are determined by the quantity of screws, nuts, and bolts ordered for one destination at one time.)

Base, one keg	..... 43.00
20,000 lb or more	.... 53.00

SCREWS, SETSCREWS

Hex Screws and High Strength Hex Screws, through 1 in. x 12 in.:

Base, one keg	..... 43.00
20,000 lb or more	.. 53.00

Hex Screws 1⅛ in. diameter and larger: See net price schedule.

Fillister Head Screws, coarse thread:

Packages	.....+70.00
Bulk	.....+28.00

Flat Head Screws, coarse thread:

Packages	.....+100.00
Bulk	.....+52.00

Setscrews, Square Head, Cup-point, coarse thread:

Packages	.....+10.00
Bulk	..... 15.00

(Bulk discounts on fillister, flat head, and set screws apply only to products ordered in these minimum quantities: ¼ in. through ⅝ in. diameter, 15,000 pieces; ⅞ in. through ⅝ in. diameter, 5000 pieces; and ¾ in. through 1 in. diameter, 2000 pieces.)

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter; 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.96
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.725
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	.....6.875
Gary,Ind. U5	.....6.875
Lackawanna,N.Y. B2.	.6.875
Minnequa,Colo. C10	...6.875
Seattle B3	.....7.025
Steelton,Pa. B2	.....6.875
Torrance,Calif. C11	...7.025

JOINT BARS

Bessemer,Pa. U5	.....7.25
Fairfield,Ala. T2	.....7.25
Joliet,Ill. U5	.....7.25
Lackawanna,N.Y. B2	...7.25
Minnequa,Colo. C10	....7.25
Steelton,Pa. B2	.....7.25

AXLES

Ind.Harbor,Ind. S13	...9.125
Johnstown,Pa. B2	.....9.125

SCREW SPIKES

Lebanon,Pa. B2	.....15.10

TRACK BOLTS, Untreated

Cleveland R2	.....15.35
KansasCity,Mo. S5	....15.35
Lebanon,Pa. B2	.....15.35
Minnequa,Colo. C10	...15.35
Pittsburgh S44	.....15.35
Seattle B3	.....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	....10.10
Lebanon,Pa. B2	.....10.10
Minnequa,Colo. C10	...10.10
Pittsburgh J5	.....10.10
Seattle B3	.....10.60
S.Chicago,Ill. R2	.....10.10
Struthers,O. Y1	.....10.10
Youngstown R2	.....10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Rethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) D-duct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.26	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	85.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.06	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.106
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
No. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa., B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si. K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.30	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.13	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.18	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	10.50	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	10.57	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.27	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	10.51	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	8.82	9.49	10.64	10.99	8.82	11.49	16.54	9.17	8.66	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City., Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Narlo, Ohio, $109.50. Magnetite: Narlo, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ¼ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Brands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.35
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill Products (Per base box; 100 lb base wt)	
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating)	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe...36.75, ton deld. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.50; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10.	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	54.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20

Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5% below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. †Depending on mesh. ‡Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe, except as noted.)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.55	$5.60	$5.50	$5.40	$5.70
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	5.75	5.90	5.80	5.70	6.00
Channels	5.75	5.90	5.80	5.70	6.00
Plates (basic bessemer)	5.65	5.70	5.60	5.50	5.80
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	23.66	23.72	23.59	23.31	25.04
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	6.05	6.10	6.00	5.90	6.20
Hot-Rolled Bands	6.05	6.10	6.00	5.90	6.20
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	....	5.95	5.95	6.20
Wire Rods, O.H. (Sumitomo, Japan)	5.95	....	5.90	5.90	6.05
Bright Common Wire Nails (‡)	7.30	7.35	7.25	7.15	7.45

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

48% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn. $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3% for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%), Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffied, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb. $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%,C 4.25% max, Si 1.0% max, S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max, 31.50c; C 0.010% max, 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%; C 0.25% max, 33.00c. Cr 65-71%; C 0.05% max, 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25 max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: .Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si. Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $2.45 per lb (all quantities) of contained W. Delivered.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, Add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l., packed 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.

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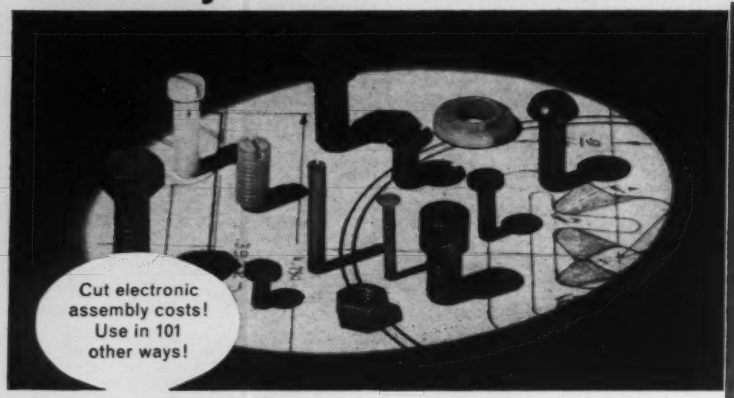

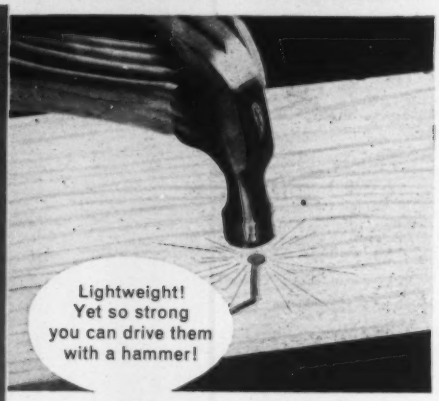

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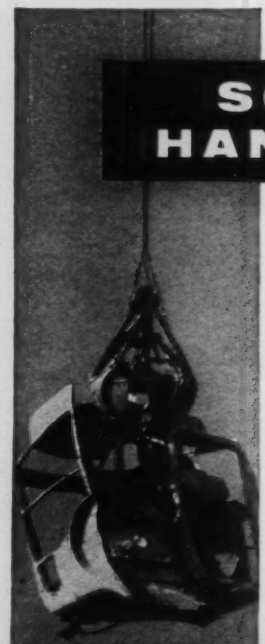

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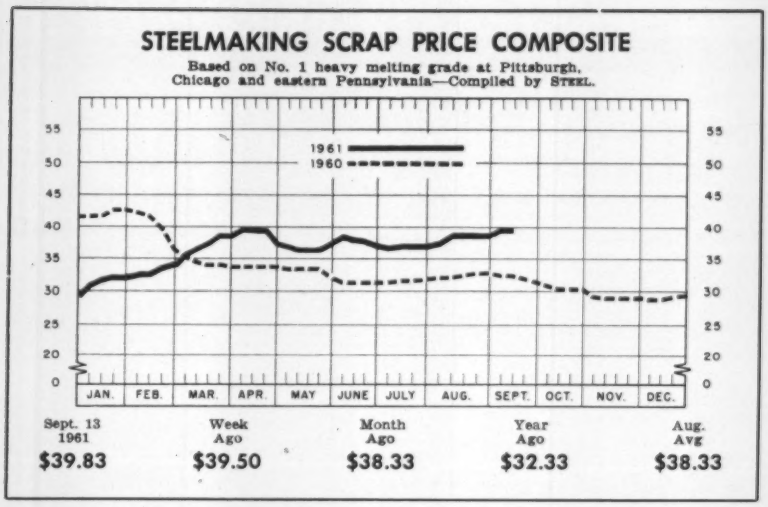


Scrap Price Rise Is Again Scored

STEEL's composite on No. 1 heavy melting grade rises to $39.83 despite easing of buying pressure. Exports continue to provide substantial support. Japanese in market

Scrap Prices, Page 160

• **Philadelphia**—Except for an advance on heavy breakable cast to $40-$42, prices on all grades are unchanged. The smaller of two Japanese buying groups has covered its requirements for next quarter. Volume was off a little from that in the current quarter, and prices were a little softer. The larger group is expected to make its purchases shortly. Meanwhile, traffic at Japanese ports continues badly jammed.

• **New York** — Open hearth steel scrap prices continue steady, with main support being provided by exports. Other grades are also unchanged. Prices on borings and turnings are largely nominal.

• **Chicago** — Steelmaking scrap prices are holding. A district mill reportedly paid $45 for No. 1 railroad heavy melting. An area consumer contracted for machine shop turnings at $20 and for short shoveling turnings at $22.

Optimism over expanding steelmaking operations continues but restricted buying by the mills offsets bullish market sentiment. District mills are operating at 74 per cent of 1960 capacity. A stronger rate is expected next month.

• **Pittsburgh** — Business is slow. Brokers' bids on scrap sold by the Pennsylvania and B&O railroads were about $2 a ton higher than last month's. No. 2 bundles are up $1 a ton on recent sales to a local consumer.

• **Cleveland**—Prices are firm and unchanged, largely on expectations of active demand arising from rising steelmaking operations. Settlement of the automotive labor problem is thought likely to be followed by a substantial increase in auto steel buying and a resulting stepup in the steel rate. The last representative sale involved a tonnage of No. 1 industrial heavy melting which went at $43. Dealer material is quoted $1-$2 a ton under that level.

• **Cincinnati**—The market is digesting a $1-$2 price increase made at the month's start on mill buying. Interest in shoveling turnings and borings for blast furnace use has pushed up prices on those grades $1 a ton, shoveling turnings now being quoted $14-$15.

• **Buffalo**—A small district mill has released scrap shipments held up since August. Dealers are still without representative new orders for No. 1 heavy melting steel from local mills, and the price on the grade remains nominal. Large tonnages of No. 1 industrial bundles are being held by a large consumer, and until this material is used, the market for No. 1 dealer material is likely to be slow.

• **St. Louis**—Prices have advanced on a number of grades, largely reflecting out-of-district buying. Increases of $1 a ton are reported on No. 1 bundles, No. 2 bundles, random length rails, and rails 18 in. and under. No. 1 busheling is quoted $2 higher. Material is coming out slowly, and the market is undersupplied. The railroads are not generating normal volume.

• **Birmingham** — The market developed new strength last week. Prices advanced $1 a ton on No. 1 heavy melting, No. 1 bundles, and electric furnace material.

• **Houston** — Except for spot purchases of No. 1 heavy melting steel for export, there has been little activity in this market. The two large Texas mills crossed up dealers by staying out of the market early this month. Both mills have substantial inventories, and it's possible neither may re-enter the market for tonnage soon. A local exporter has heard the Japanese may delay October cargoes in a move to lessen port congestion in Japan.

• **Tacoma, Wash.**—Scarcity of the better grades of scrap has resulted in a rise of $2 to $3 a ton in this market. Local dealers are paying $48 for No. 1 and $45 for No. 2. In Seattle, the market is quoted $44 for No. 1 unprepared. Tonnages of good grade material are not being generated in sufficient volume to meet current demands. Exporters are seeking to fill their commitments, and mill buying has increased.

• **San Francisco**—Prices are steady on the steelmaking grades of scrap, but No. 1 cupola cast is quoted up $1 a ton on improved demand. The steel grades continue to move at a slow pace.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Sept. 13, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 13	$39.83
Sept. 6	39.50
Aug. Avg.	38.33
Sept. 1960	32.00
Sept. 1956	59.08

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	38.00-39.00
No. 2 bundles	*25.00-26.00*
No. 1 busheling	37.00-38.00
No. 1 factory bundles	47.00-48.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	43.00-44.00
3 ft and under	40.00-41.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	44.00-45.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	47.00-48.00§

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*
Rails, 2 ft and under	*53.00-54.00*
Rails, 18 in. and under	*54.00-55.00*
Random rails	45.00-46.00
Angles, splice bars	*45.00-46.00*
Railroad specialties	*48.00-49.00*
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*41.00-43.00*
No. 1 hvy melt., dealer	*40.00-41.00*
No. 2 hvy melting	*36.00-37.00*
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	24.00-25.00
No. 1 busheling, indus.	*41.00-43.00*
No. 1 busheling, dealer	*40.00-41.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*21.00-22.00*
Shovel turnings	*21.00-22.00*
Cast iron borings	*21.00-22.00*
Cut structurals, 3 ft	45.00-46.00
Punchings & plate scrap	47.00-48.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Stove plate	38.00-39.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	48.00-49.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00-45.00*
R.R. malleable	48.00-49.00
Rails, 2 ft and under	51.00-52.00
Rails, 18 in. and under	52.00-53.00
Angles, splice bars	47.00-48.00
Axles	58.00-59.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles, solids	190.00-195.00
18-8 turnings	110.00-115.00
430 bundles & solids	95.00-100.00
430 turnings	55.00-60.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	64.00-65.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	42.00-43.00
No. 1 bundles	38.00-39.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	38.00-39.00
Machine shop turnings	*15.00-16.00*
Shovel turnings	*19.00-20.00*
Mixed borings, turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut foundry steel	*36.00-37.00*
Cut structurals, plate, 2 ft and under	*43.00-44.00*
Low phos, punchings & plate	*39.00-40.00*
Alloy free, short shovel turnings	*20.00-21.00*
Electric furnace bundles	40.00-41.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	*44.00-45.00*
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	*50.00-51.00*
Rails, 2 ft and under	*50.00-51.00*
Rails, rerolling	50.00-57.00
Rails, 18 in. and under	*52.00-53.00*
Cast steel	*43.00-44.00*
No. 1 railroad cast	49.00-50.00
Railroad specialties	*46.00-47.00*
Angles, splice bars	*46.00-47.00*
Rails, rerolling	*57.00-58.00*

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*165.00-170.00*
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	*42.00-43.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	25.00-26.00†
Machine shop turnings	*17.00-18.00*
Shovel turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Low phos.	*43.00-44.00*
Electric furnace bundles	*43.00-44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling	35.00-36.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	12.00-13.00
Shovel turnings	*14.00-15.00*
Cast iron borings	*14.00-15.00*
Low phos., 18 in.	40.00-41.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	*30.00-31.00*
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*
Rails, 18 in. and under	48.00-49.00
Rails, random lengths	42.00-43.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Mixed cast	31.00-32.00
Stove plate	28.00-29.00
Heavy breakable	27.00-28.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00

PHILADELPHIA

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	43.00-44.00
No. 2 bundles	26.00-27.00
No. 1 busheling	43.00
Electric furnace bundles	45.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	44.00-46.00
Couplers, springs, wheels	45.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	*40.00-42.00*
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	31.00
No. 1 bundles	*36.00*
No. 2 bundles	*26.00*
No. 1 busheling	*36.00*
Machine shop turnings	16.50
Shovel turnings	18.50

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00
Rails, random lengths	*41.00*
Rails, rerolling	56.00
Rails, 18 in. and under	*45.00*
Railroad specialties	43.00
Angles, splice bars	40.00†

BIRMINGHAM

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	30.00-31.00
No. 1 bundles	*39.00-40.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	44.00-45.00
Structurals & plate	43.00-44.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	*37.00-38.00*
2 ft and under	*38.00-39.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, rerolling	*51.00-52.00*
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	42.00-43.00
Angles, splice bars	43.00-44.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
Machine shop turnings	12.50-13.00
Crushed turnings	17.00
Low phos. plate & structurals:	
3 ft	41.00-42.00
2 ft and under	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	41.50-42.50
Heavy breakable	25.00-26.00
Foundry malleable	29.00-30.00
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	40.00-41.00

LOS ANGELES

No. 1 heavy melting	43.00-45.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	41.00
No. 2 bundles	29.00
No. 2 bundles (export)	30.00
Machine shop turnings	20.00
Shovel turnings	20.00
Cast iron borings	17.00-18.00
Electric furnace scrap	50.00-52.00

Cast Iron Grades

No. 1 cupola	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-45.00

PORTLAND, OREG. (Prepared, f.o.b. car)

No. 1 heavy melting	46.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	46.00
No. 1 hvy (unprepared)	41.00
No. 2 heavy melting	43.00
No. 2 hvy (unprepared)	38.00
No. 2 bundles	32.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	38.00
Stove plate (f.o.b. plant)	36.00
Unstripped motor blocks	37.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	29.00**
Machine shop turnings	16.00-18.00
Mixed borings, turnings	16.00-18.00
Cast iron borings	16.00-18.00
Heavy turnings	16.00-18.00
Shovel turnings	16.00-18.00

Cast Iron Grades

No. 1 cupola	*47.00*
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

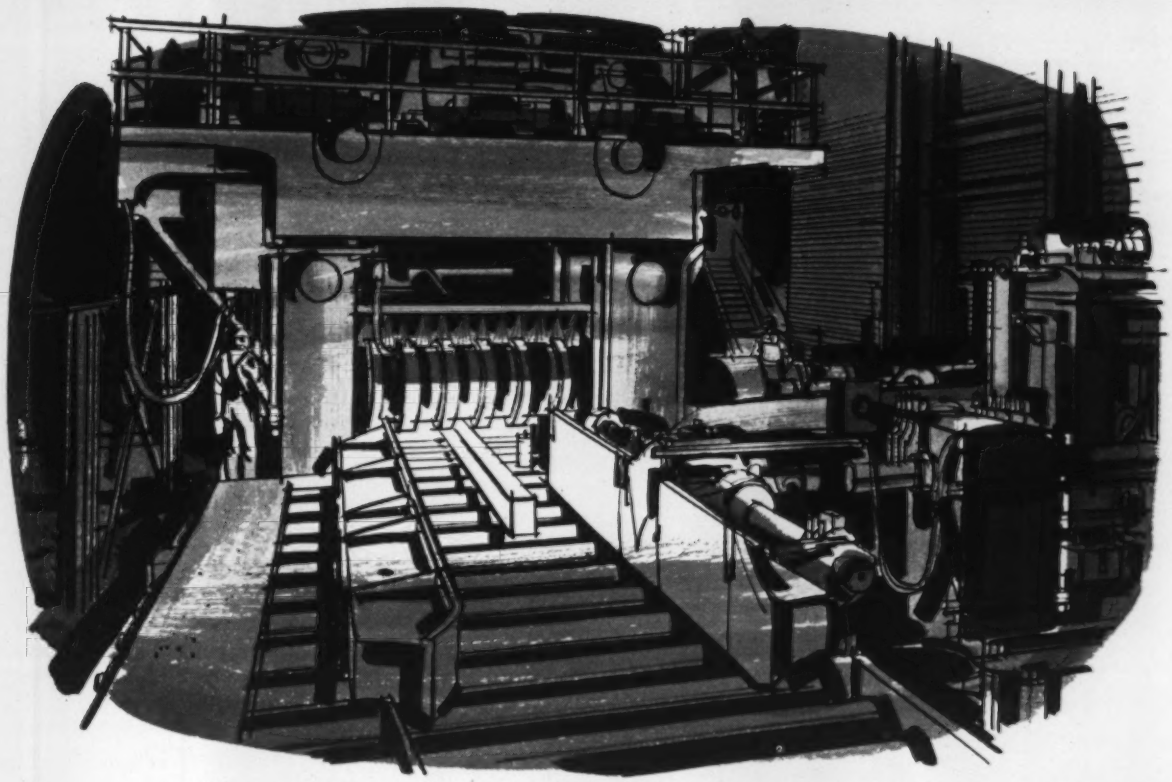
No. 1 heavy melting	*30.00*
No. 2 hvy melt, 2 ft & under	*29.00*
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	*22.00*
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	*30.00*
Unprepared	*24.00*
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

DANGEROUS INTRUDERS IN IRON AND STEEL SCRAP



SULPHUR . . . FRIEND OR FOE?

Sulphur is an element of several faces. As a sulphuric acid compound it occupies an important place in the steel industry where it is used for cleaning metal, the recovery of ammonia products from gas and in making chemical analyses.

As an element in the composition of steel, however, sulphur is welcome only for the free machining properties it brings to certain grades. A small percentage can more than double the speed and ease with which steel bars can be machined into gears, screws, bolts, and other small parts. There is even a free machining type of stainless steel. In these instances, sulphur serves the steel industry as a friend.

But, sulphur can be an enemy as well when it appears in the steelmaking furnace as an unknown residual element.

Sulphur makes steel hot short, meaning that it cracks and tears in rolling or forging processes. It can ruin a heat of stainless steel when its presence is unknown. Therefore, scrap, high in sulphur content, unless it is properly segregated, must be considered a foe.

For scrap of known analysis, our personnel, equipment and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

Luria Brothers and Company, Inc.

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5950 S. BOYLE AVE., LOS ANGELES 58, CAL. • *Cable Address:* FORENTRACO

Congress Holds Key to Tin Prices

Nonferrous Metal Prices, Pages 164 & 165

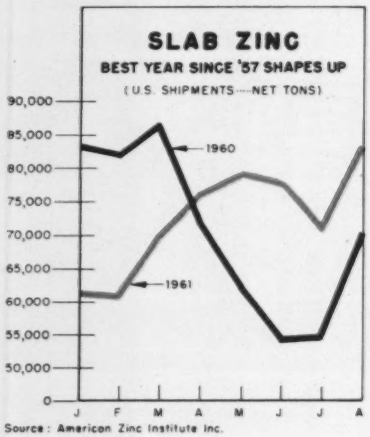
WHAT HAPPENS to the world tin market during the remainder of 1961 will be largely decided on Capitol Hill over the next few days.

The General Services Administration has petitioned Congress to authorize the release of 50,000 long tons of tin from the strategic stockpile. GSA is asking authority to begin immediate disposal of 10,000 long tons. Normally, there is a six months' waiting period from the time Congress authorizes disposal of a stockpile material until its release to the public.

A favorable decision would undoubtedly mean lower prices since the fears of a shortage would be dispelled. Otherwise, the price will remain at inflated levels for the foreseeable future.

The tin market has been in a constant state of jitters since early in the year when it became obvious that Free World supply would fall short of demand this year. The results: A fear psychology and widespread speculation that drove the price to over $1.25 a pound earlier this month. Even disposal of the 10,000 tons of metal held by the International Tin Council and the 4000 tons in a special U. S. tin inventory weren't enough to turn the upward tide. (On Sept. 13, GSA rejected all bids received on 1000 tons of this special metal and set Sept. 26 as the deadline for bids on 817 tons of surplus tin.)

• **Users Ask Release**—Strong consumer pressures began to be put on the government for lease of stockpile tin. The office of Civil & Defense Mobilization declared the stockpile held 50,000 tons of tin in excess of revised defense needs. The departments of Commerce, Defense, and State gave their blessings to the proposal to release the metal.



Source: American Zinc Institute Inc.

As STEEL went to press, the tin disposal legislation was being considered by the Armed Services Committees of the House and Senate. Chances for passage are hard to assess. It's no secret that many powerful congressmen would like to pare down the excess stocks. And GSA has stated that "current market conditions are extremely favorable to tin disposal."

The biggest stumbling block may be time. Congress is getting set to adjourn and whether it will be able to consider the tin question first remains to be seen.

• **Disposal Worries Many** — Tin disposal doesn't meet with favor in all quarters. Many traders believe it will seriously hurt their business. A few producing countries have already voiced their objections. Some observers see in the plan a broad threat of further meddling in the free market whereby the government will set itself up as the arbiter of prices. There are also fears that tin disposal might pave the way for public sale of other stockpiled metals.

GSA has pledged that it will not disrupt the normal market. Plans call for releasing small lots at unspecified intervals at the going market price.

In the Markets

• **Zinc Gains**—August slab zinc shipments reached 84,271 tons, the best mark since March of 1960. It now looks like the industry will have its best tonnage year since 1957, with shipments slightly exceeding 900,000 tons. Producer stocks in August dropped for the fifth straight month—to 188,190 tons. Special high grade zinc, which has had a lackluster year, was more in demand in August, probably because of increased orders from Detroit. September zinc shipments will probably total about the same as August's.

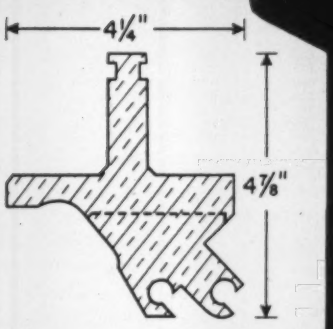
• **Copper Brightens** — Strikes that were holding back thousands of tons of copper production a month in Chile and the U. S. have been settled. The only cloud on the horizon is the continued rioting in the Congo and Northern Rhodesia.

NONFERROUS PRICE RECORD

	Sept. 13 Price	Last Change	Previous Price	Aug. Avg	July Avg	Sept., 1960 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	26.000
Copper	31.00	May 19, 1961	30.50	31.000	31.000	33.000
Lead	10.80	Dec. 13, 1960	11.80	10.800	10.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	81.25	June 30, 1961	74.00	81.250	81.250	74.000
Tin	121.50	Sept. 13, 1961	120.75	119.685	116.266	102.355
Zinc	11.50	Jan. 9, 1961	12.00	11.500	11.500	13.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

AGAIN-



DOTTED LINE SHOWS where two copper extrusions were brazed together to make original part. When you consider the intricate shape and the weight of the part (a 3⅞" section measuring 4¼" x 4⅞", weighing 8 lbs. 7 ozs.), you can readily understand why it was at first thought impractical to make it into a single extrusion.

Revere helps "fit the metal to the job"

AND ONE COPPER EXTRUSION REPLACES TWO, SAVING TIME AND MONEY WITH CONSIDERABLE INCREASE IN LIFE OF PART

The Revere Copper Extrusion shown above was originally two extrusions brazed together. And, since it is quite an intricate shape, and weighty, it was at first thought impractical to make as a single extrusion, but the possibility was believed to be worth investigating.

Through close collaboration between the manufacturer's engineering department and the Revere Methods and Production Departments, it was found possible to combine these two sections into a single extrusion. Work was started, dies were made and test runs conducted. The tooling (for hot extrusion was followed by cold drawing) posed special problems. It had to be both rugged and precise in order to produce this monster to the manufacturer's exacting specifications. Finally, a sample extrusion was delivered to the customer for testing and found to be right in every way.

Not only does this new, single extrusion eliminate a great deal of machining but obviates the necessity of purchasing two separate extrusions and brazing them together. This means substantial savings in dollars and time involved, plus a longer-lasting part, because the heat required to join the two pieces originally used, tended to soften the built-up unit, thus shortening its useful life.

So, before you give up on what at first may seem an insoluble problem, why not call in Revere's Technical Advisory Service? It's entirely possible they can help you "fit the metal to the job" with a resultant saving in the production of a superior product.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

Sales Offices in Principal Cities, Mills: Rome, N. Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford and Plymouth, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb.

Distributors Everywhere.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $40 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pig, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l, 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l, 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 121.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max), $1.37 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7.25-7.75 per lb; 100-500 lb, $6.75-7.25 per lb; 500-1000 lb, $6.25-6.75; over 1000 lb, $6.25 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00; No. 12 foundry alloy (No. 2 grade), 21.25; 5% silicon alloy, 0.60 Cu max, 23.00; 13 alloy, 0.60 Cu max, 23.00; 195 alloy, 24.25; 108 alloy, 21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.50.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $5.70-15.50; sheared mill plate, $4.45-9.00; wire, $5.00-9.50; forging billets, $3.00-4.75; hot-rolled and forged bars, $3.39-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $11.00-16.00; H.R. strip, $11.00-15.00; C.R. strip, $13.00-18.00; forged or H.R. bars, $11.00-15.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R. .	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.183	24-72	72-180	45.40-48.00
0.183-0.154	24-72	72-180	45.40-48.00
0.154-0.120	24-72	72-180	45.90-48.80
0.120-0.096	24-72	72-180	45.90-48.80
0.096-0.076	24-72	72-180	46.40-50.30
0.076-0.060	24-72	72-180	46.90-51.10
0.060-0.047	24-72	72-180	47.40-52.30
0.047-0.037	24-72	72-180	47.90-53.70
0.037-0.030	24-72	72-180	48.40-55.30
0.030-0.023	24-60	72-180	48.90-57.10
0.023-0.018	24-48	72-144	49.40-57.40
0.018-0.014	24-48	72-144	51.20-58.00
0.014-0.011	24-48	72-144	53.50-60.00
0.011-0.0085	24-36	72-96	56.20
0.0085-0.007	24-36	72-96	59.20
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates: 1100, 3003, and 5005, mill finish, 0, H12, and H14 tempers, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
3.000-2.000	6-144	72-240	46.10-51.00
2.000-1.251	6-144	72-240	46.50-51.30
1.251-0.751	6-144	72-240	45.50-50.60
0.751-0.250	6-144	72-240	45.50-50.60

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Rounds, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in.,103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. width; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.00-25.50; No. 2 heavy copper and wire, 23.25-23.75; light copper 20.50-21.00; No. 1 composition red brass, 22.00-22.50; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

(Copper or Copper Alloy No.)	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper (110)	56.13b	50.36–51.36	....	57.32
Yellow Brass (268, 270)..	49.27	35.77c	49.56	53.43
Low Brass, 80% (240)..	52.15	52.09	52.44	56.21
Red Brass, 85% (230) ..	53.17	53.11	53.46	57.23
Com. Bronze, 90% (220)	54.73	54.67	55.02	58.54
Manganese Bronze (675)	57.69	51.27	61.54	....
Muntz Metal (365)	51.94	47.25	....	....
Naval Brass (464)	53.94	47.75	60.25	58.10
Silicon Bronze (651)	61.39	60.58	60.68	79.80
Nickel Silver, 10% (745)	65.56	67.16	66.91	....
Phos. Bronze, A-5% (510)	76.97	77.47	76.72	78.90

SCRAP ALLOWANCES d (Based on copper at 31.00c)

Clean Heavy	Rod Ends	Clean Turnings
27.00	27.00	26.25
20.375	19.50c	18.50c
22.875	22.625	22.125
23.875	23.625	23.125
24.75	24.50	24.00
19.25	19.00	18.50
19.125	18.875	18.375
19.00	18.75	18.25
26.50	26.25	25.75
26.00	25.75	13.00
28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 21.00-21.50; new brass clippings, 18.50-19.00; light brass, 15.50-16.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 17.50-18.00; auto radiators, unsweated, 18.25-18.75; cocks and faucets, 18.50-19.00; brass pipe, 18.50-19.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00 rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.50; light copper, 24.25; refinery brass (60% copper) dry copper content, 25.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.50; No. 2 heavy copper and wire, 26.50; light copper, 24.25; No. 1 composition borings, 24.00-24.50; No. 1 composition solids, 24.50-25.00; heavy yellow brass solids, 19.00; yellow brass turnings, 18.00; radiators, 21.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 139.50; 200-499 lb, 138.00; 500-999 lb, 137.50; 1000 lb or more, 137.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 88.70; 100-600 lb, 79.00; 700-1900 lb, 76.30; 2000-9900 lb, 74.40; 10,000 lb or more, 73.10.

Stannous Chloride (Anhydrous): 100 lb, 147.80; 400 lb, 137.80; 800-19,900 lb, 116.50; 20,000 lb or more, 112.30.

Stannous Sulphate: Less than 50 lb, 155.10; 50 lb, 125.10; 100-1900 lb, 123.10; 2000 lb or more, 121.10.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

Scrap Consumption Drops 13 Per Cent During July

Domestic consumption of iron and steel scrap in July totaled 4,295,000 gross tons, a drop of 13 per cent from the June volume, reports the U. S. Bureau of Mines. Use was the smallest for any month since February, this year.

The total charge of metallics (scrap and pig iron) in the month was 9,320,000 tons, 8 per cent below that of the previous month. The charge consisted of 46 per cent scrap and 54 per cent pig iron compared with 49 per cent scrap and 51 per cent pig iron in June.

Consumer stocks of scrap as of July 31 totaled 7,614,000 tons, 2 per cent above the June 30 tonnage. Stocks of pig iron at the end of the month were 2,735,000 tons, slightly above the 2,730,000 held at the end of June.

Home scrap produced during July accounted for 2,692,000 tons, 10 per cent less than in the preceding month. Purchased scrap received by consumers amounted to 1,734,000 tons, 14 per cent less than in June, and the lowest since February. Of the purchased material, 85 per cent came from dealers and 15 per cent from other sources.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 156

Coke production totaled 4,391,785 net tons (72,601 beehive and 4,319,184 oven) in July, reports the U. S. Bureau of Mines. Output in the preceding month was 4,287,254 tons (77,658 beehive and 4,209,596 oven) and in July, 1960, amounted to 4,039,800 tons (52,700 beehive and 3,987,100 oven).

Production in the first seven months this year was 27,509,373 tons (490,836 beehive and 27,018,537 oven). That compares with output of 38,600,400 tons (691,200 beehive and 37,909,200 oven) in the same period last year.

Producer stocks of oven coke at the end of July amounted to 4,353,533 tons, equal to 31.2 days' production. On the same date a year ago, the total was 4,049,874 tons, 31.5 days' production.

Bethlehem Steel's Lackawanna plant is getting ready to start up a new battery of coke ovens. It will take about two months to heat the new ovens to the point where they'll be ready to start producing coke.

July Steel Employment Is Highest Since August '60

Steel industry employment in July increased to 538,383 (hourly and salaried employees), up 6101 from June's total and 60,840 from the low point in January this year. The total was the highest for any month since August, 1960.

Payroll costs for hourly employees rose to a record $3.520 during July, the American Iron & Steel Institute's monthly report (covering 98.2 per cent of the 1960 production of the industry) shows. In addition, employee benefits (pensions, insurance, Supplemental Unemployment Benefits, and legally required payroll taxes) raised the total employment cost per hour to over $4 during the month.

The aggregate payroll for hourly and salaried employees was $307,047,803 during July vs. $321,075,715 in June.

Wage earners worked an average

CLASSIFIED

Positions Wanted

PURCHASING
METALLURGY
MATERIALS ENGINEERING

METALLURGIST, B. S. Degree, age 35 six years metallurgical experience with accessories, farm equipment and aircraft manufacturers, specializing in material selection, heat treatment, electroplating and other processing. Four years purchasing for high reliability electronics firm, including buying, vendor survey and liaison, and value analysis. Desire responsible position in one of above fields.

Box 962, STEEL
Penton Bldg. Cleveland 13, Ohio

Help Wanted

WANTED — ASSISTANT SUPERINTENDENT blast furnace operation. Young well established completely integrated steel company located in great southwest area needs to fill key position in its blast furnace department with well qualified man age limit 45 years. Company currently engaged in multi-million dollar expansion program. Excellent opportunity. Submit complete resume giving personal history, education, experience and salary requirements. All replies held confidential. Box 961, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXPERIENCED ROLL TURNER to turn merchant bar mill rolls. Reply Box 960, STEEL, Penton Bldg., Cleveland 13, Ohio.

$8.00 MORE PER TON FROM TURNINGS

American Rolling Ring Metal Turnings Crushers quickly pay for themselves. Savings of approximately $4.00 per ton through extra cutting-oil recovery from crushed turnings often pay for the crusher in a short time. In addition, uniform chips command a higher price (up to $4 more per ton). Add to this the valuable savings in storage space (up to 75% less), the easier handling, the heavier car loadings possible, and you have tremendous profit advantages with the American Crusher working in your plant.

If your turnings amount to 20 tons or more a month, there's an American Crusher designed to pay off big for you.

American has manufactured Turnings Crushers since 1917 and makes a wide range of models with capacities from 1 ton to 50 tph.

Write for Bulletin #159.

American PULVERIZER COMPANY
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
1539 MACKLIND AVE, ST. LOUIS 10, MISSOURI 6103

of 33.2 hours weekly in July vs. 37.5 in June. Vacations accounted for the decline.

Record Beer Sales Boost Metal Can Use in 1960

U. S. brewers used 8.9 billion metal cans for packaging beer last year, consuming 862,253 net tons of steel and 1982 gross tons of tin. Sales of beer in cans amounted to 26,859,027 barrels (31 gallons each), accounting for 37.9 per cent of package sales. Ten years ago, only 25.8 per cent of packaged beer was sold in cans.

The greatest single commodity use of cans in this country is in the packaging of malt beverages. Four-fifths of all beer and ale marketed in 1960 was sold in cans and bottles. Over-all sales of beer and ale reached an all-time high of 87,912,745 barrels, a 0.3 per cent increase over the 87,622,359 barrels reported for 1959.

New York led the states in beer and ale production in 1960 with 11,156,789 barrels. Wisconsin was second with 10,589,000, followed by Missouri, New Jersey, California, and Pennsylvania.

New York also led in beer consumption with 10,230,212 barrels, followed by California and Pennsylvania. However, Wisconsin held its traditional first place in per capita consumption with 25.6 gallons. National per capita use was 15.1 gallons.

The U. S. led the world in gross consumption of beer with more than 87 million barrels. West Germany was second with 46 million, and the United Kingdom third with 38 million.

Pig Iron . . .

Pig Iron Prices, Page 155

Merchant pig iron buying is heavier, but it has not made the gains anticipated.

With tonnages readily available, no sharp spurt is expected to develop at least through October.

Republic Steel Corp. is shutting down its blast furnace at Troy, N. Y., because of a "reduced demand for foundry grade pig iron . . . coupled with a large inventory at the furnace." The firm also shut down its iron ore mine in Lyon Mountain, N. Y.

Advertising Index

Aeroquip Corporation 4
Alco Products, Inc. 34, 35
American Air Filter Co., Inc. 50, 51
American Hoist & Derrick Co. 2
American Monorail 168
American Oil Co. 14, 15
American Optical Co., Safety Products Division 22
American Pulverizer Co. 166
American Sealants Co. 11
Amsler Morton Co., A Textron Co. 107
Anti-Corrosive Metal Products Co., Inc. 158
Aristoloy Steel Division, Copperweld Steel Co. 71
Armco Steel Corporation, Armco Division ..96, 97
Arwood Corporation 32, 33

Bethlehem Steel Co. 1
Birdsboro Corporation 95
Blaw-Knox Co. 23, 24, 25, 26
Bliss, E. W., Co., Mackintosh-Hemphill Division ..... Inside Back Cover
Bridgeport Rolling Mills Co. 74

Cambridge Wire Cloth Co., The 152
Carlson, G. O., Inc. 68
Chambersburg Engineering Co. 86
Cincinnati Milling Machine Co., The, Special Machine Division 61
Cleveland Metal Abrasive Co. 94
Cleveland Worm & Gear Division, Eaton Manufacturing Co. 52
Columbia-Geneva Steel Division, United States Steel Corporation 37
Columbus McKinnon Chain Division 91
Cone-Drive Gears, Division Michigan Tool Co. 132
Copperweld Steel Co., Aristoloy Steel Division 71
Copperweld Steel Co., Ohio Seamless Tube Division 128, 129

Dempster Brothers, Inc. 143
Despatch Oven Co. 145
Doehler-Jarvis Division of National Lead Co. 39
Dykem Co., The 158
Dynamatic Division, Eaton Manufacturing Co. 82

Eaton Manufacturing Co., Cleveland Worm & Gear Division 52
Eaton Manufacturing Co., Dynamatic Division 82
Electric Controller & Mfg. Division, Square D Co. 92, 93
Electric Furnace Co., The 67
Erie Bolt & Nut Co. 142

Falk Corporation, The 124, 125
Farrel-Birmingham Co., Inc. 109
Feller Engineering Co. 90

Garlock, Inc. 27
General Coating, Inc. 138
Gisholt Machine Co. 47
Gleason Works 111
Goodyear Tire & Rubber Co., Inc., The, Industrial Products Division 8, 9

Hamilton Foundry, Inc. 131
Harbison-Walker Refractories Co. 45, 46
Harnischfeger Corporation 133, 134
Harrington & King Perforating Co., Inc., The 10
Heald Machine Co., The .... Inside Front Cover
Heresite & Chemical Co. 138
Hill Acme Co., The 135
Hobart Brothers Co. 140
Humble Oil & Refining Co. 79

Ingersoll-Rand 31

Jeffrey Manufacturing Co., The 42
Jones & Laughlin Steel Warehouse Division 43

Kookuk Electro-Metals Co., Division of Vanadium Corporation of America 122
Kobe Steel Works, Ltd. 144
Koppers Co., Inc., Coupling Department 44

LeBlond, R. K., Machine Tool Co., The 48
Luria Brothers & Co., Inc. 161

Mackintosh-Hemphill, Division of E. W. Bliss Co. ..... Inside Back Cover
Magnaflux Corporation 84, 85
Marathon Specialty Steels, Inc. 136
Marchant, Geo. P., Co. 132
Meehanite Metal Corporation 130
Metal Blast, Inc. 141
Michigan Tool Co., Cone-Drive Gears Division 132
Midwest Steel Division of National Steel Corporation 72
Morgan Engineering Co., The 120

National Bending Machinery Corporation 88
National Lead Co., Doehler-Jarvis Division .. 39
National Steel Corporation 72

Ohio Seamless Tube Division of Copperweld Steel Co. 128, 129
Oilgear Co., The 7
Olin Aluminum 112, 113
Owen Bucket Co., The 158

Pilbrico Co. 38

Republic Steel Corporation 12, 13
Revere Copper & Brass, Inc. 163
Roto-Finish/Ransohoff 115, 116
Russell, Burdsall & Ward Bolt & Nut Co. 89
Ryerson, Joseph T., & Son, Inc. 16

St. Lawrence Columbium & Metals Corporation 158
Somers Brass Co., Inc. 117
SPO, Inc. 81
Square D Co., Electric Controller & Mfg. Division 92, 93
Standard Pressed Steel Co. 28, 29
Steel Service Center Institute 126, 127
Sun Oil Co. 21

Tennessee Coal & Iron Division, United States Steel Corporation 37
Textron Co. 107
Timken Roller Bearing Co., The .... Back Cover
Torrington Co., The 36
Tubular Rivet & Stud Co. 76
Tyler, W. S., Co., The 87

United States Steel Corporation, Subsidiaries 30, 37, 40, 41
United States Steel Export Co. 37
Universal Atlas Cement Division, United States Steel Corporation 30

Vanadium Corporation of America, Kookuk Electro-Metals Co. Division 122
Van Norman Machine Co., A Division of Van Norman Industries, Inc. 123
Virginia Department of Conservation & Economic Development 62

Wales Strippit, Inc. 98
Wean Engineering Co., Inc., The 3
Weirton Steel Division of National Steel Corporation 72
Whiting Corporation 151

Table of Contents, Page 19

Classified Advertising, Page 165

MEMO TO MIDDLE MANAGERS:

How to Become President

COMING IN

Sept. 25

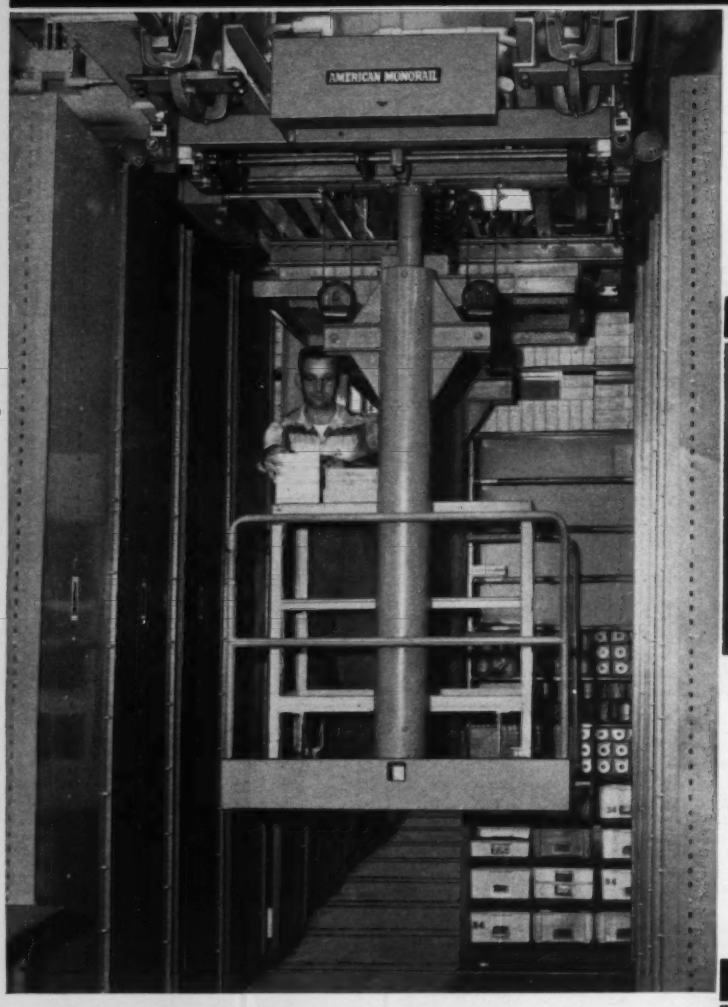
STEEL

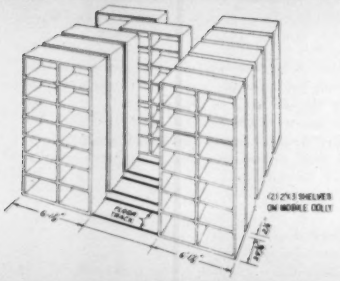
Next week, the editors will present a survey of top metalworking presidents on what they feel are the most common shortcomings among middle managers.

How can the faults be corrected? How will tomorrow's presidents differ from today's?

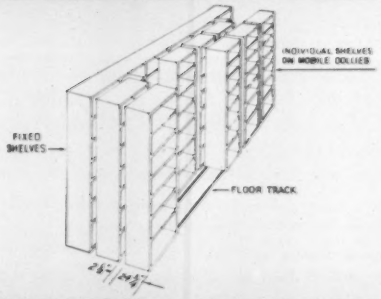
The Sept. 25 article will answer those and many other questions.

LOOK MA....NO AISLES!





ACTIVE STORE ROOM



INACTIVE STORE ROOM

An American Monorail carrier plus mobile shelves added 7,500 sq. ft. of usable storage space to a Pennsylvania plant.

Ten foot high shelving units equipped with grooved wheel dollies ride on double rails mounted flush to the floor. Shelf units roll out into the aisle smoothly with a pull equal to 1% of their total weight. The Monorail carrier, used for loading and unloading shelves, has a photo cell safety device that prevents running into a shelf unit.

Major Benefits: Stock stays cleaner and the amount of space required for aisles is cut in half.

Free Folder — pictures and describes stacking by specialized American Monorail Stackers in many types of warehouses. Write for Bulletin SB-1.

AMERICAN MONORAIL

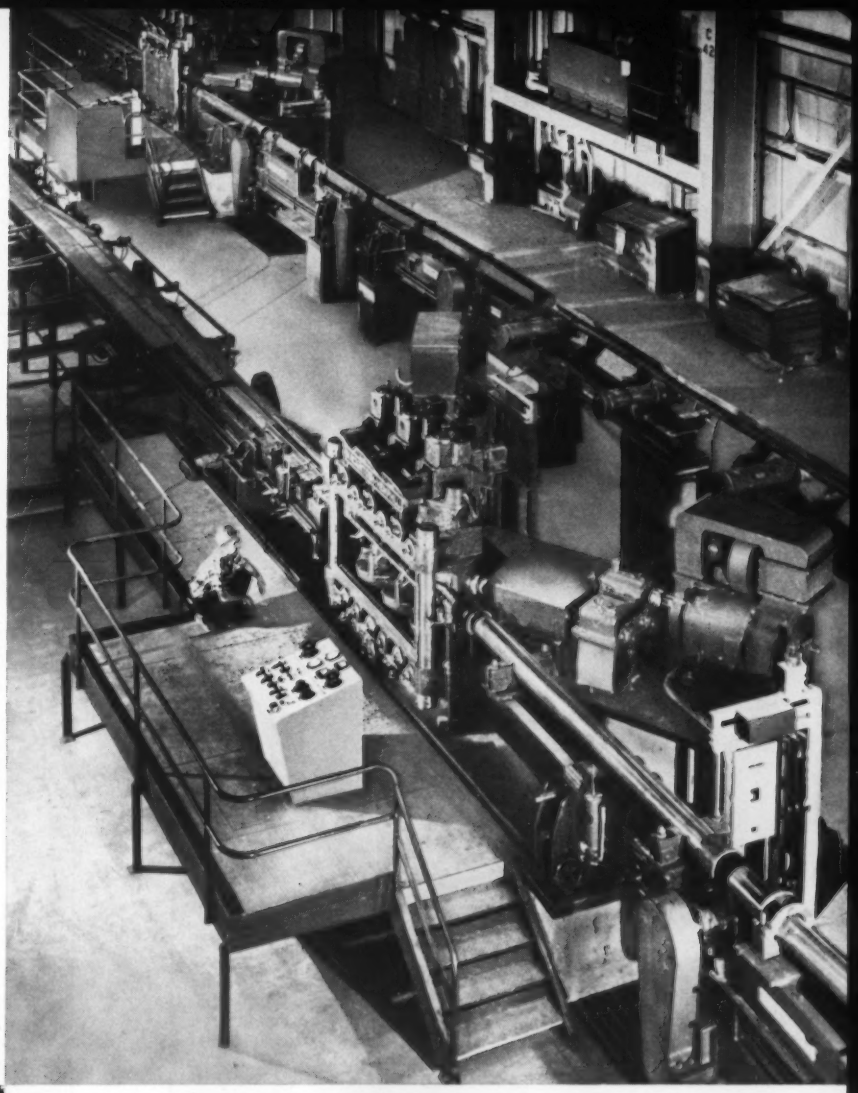
ENGINEERED MATERIALS HANDLING

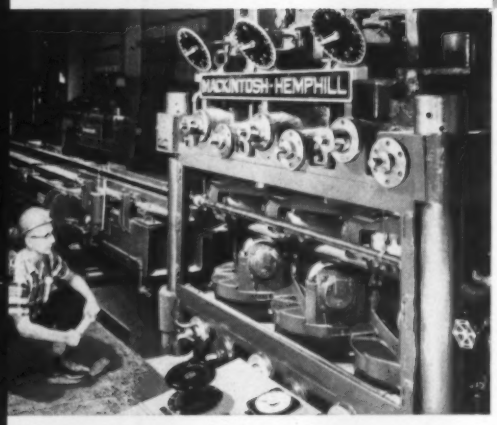
1102 EAST 200th STREET CLEVELAND 17, OHIO

© A. M. Co. 1961

DIVISIONS: Conveyor Division, Tipp City, Ohio — Canadian Monorail Co., Ltd., Brampton, Ont.

Why Mack-Hemp straighteners were selected for the world's most modern continuous weld pipe mill





The new continuous pipe mill at Lorain Works of U.S. Steel's National Tube Division is probably the most productive facility of its kind in the world, exceeding the record-breaking pipe mill at Fairless Works.

With straightness and roundness of delivered pipe more critical than ever, the Lorain Works assigns this important finishing task to two Mackintosh-Hemphill 6-roll guideless rotary straighteners. The two can process 1800 feet of pipe per minute. Finished pipe is perfectly straight and round, without spiral markings. "End hooks" at back and front are completely removed. Moreover, the straighteners' open three-post construction makes the rolls readily accessible, so that set-up time is cut to a minimum.

If you're concerned with straightening pipe or tube—no matter what the diameter or wall thickness—it will pay you to talk to Mack-Hemp. We have helpful information for you.

MACKINTOSH-HEMPHILL DIVISION PITTSBURGH U.S.A.

BLISS

MACKINTOSH-HEMPHILL
Division of E. W. BLISS Company
Pittsburgh and Midland, Pa.

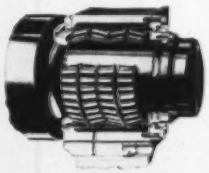
1 YEAR LUBE COST ON 3 REVERE MILLS: $115
with oil mist lubricated Timken® back-up and work roll bearings

You probably spent as much money lubricating your car last year as Revere Copper and Brass Incorporated spent on these three mills together. They used 3 barrels of oil in a year. All three of these aluminum mills are on Timken® tapered roller bearings, with standard tapered bore (TQIT) bearings on the back-up rolls. And furthermore, operators of the two rolling mills in the Revere plant at Chicago report that after three years of operation, the original grinding marks were still clearly visible in the load zones of the back-up roll bearings indicating no measurable wear.

In addition to the lubrication economies of oil mist systems on Timken bearing-equipped mills, Revere's experience proves that the "Balanced Proportion" design of Timken bearings, increases roll neck strength, increases mill rigidity and keeps the aluminum being rolled on gage.

Because Timken bearings lend themselves to oil mist lubrication, operators realize another big advantage. No seal leakage is experienced, thereby eliminating staining of rolled product and contamination of rolling solution.

If you're buying or building a rolling mill, be sure to get the latest information on roll neck and screw down bearings from the Timken Company. Our graduate engineer salesmen will work with you to help you get the most bearing capacity, the most bearing life for your bearing dollar. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

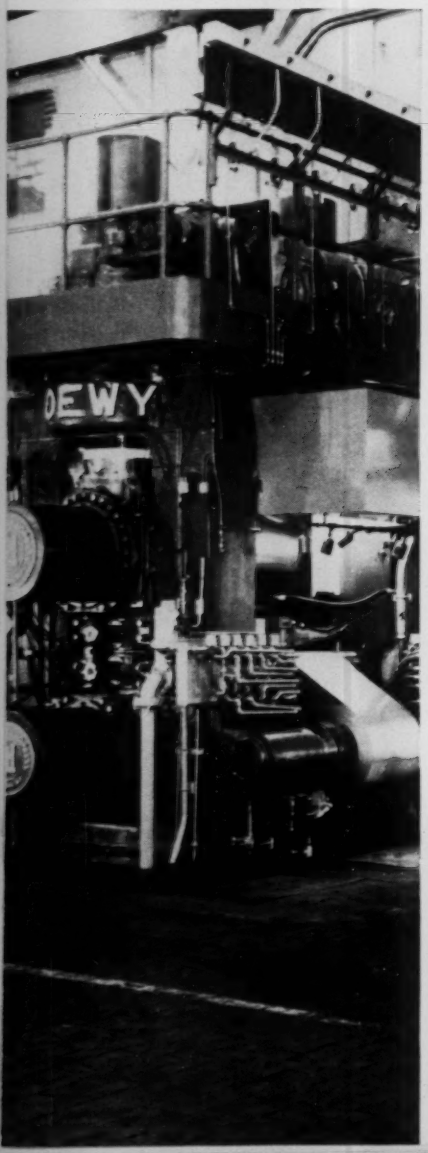


Industry rolls on

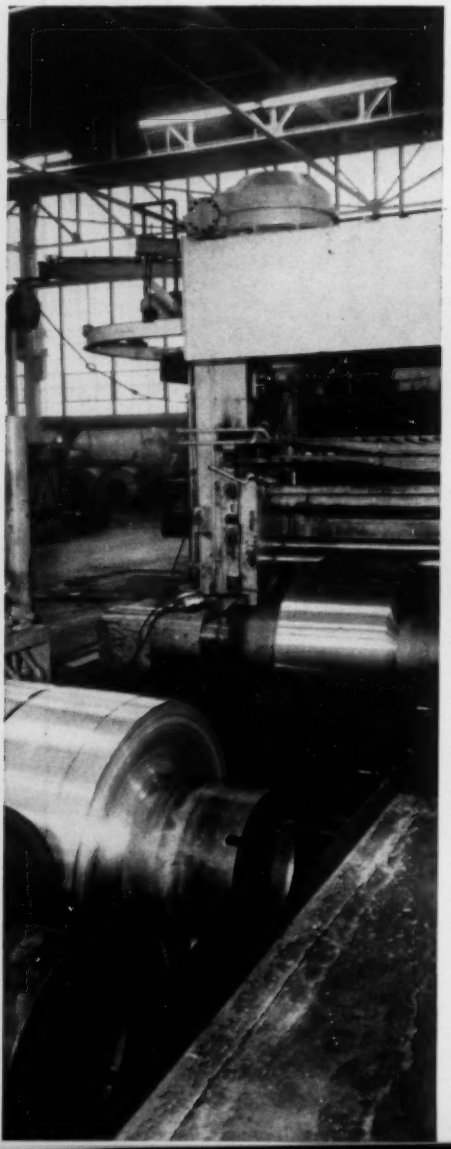
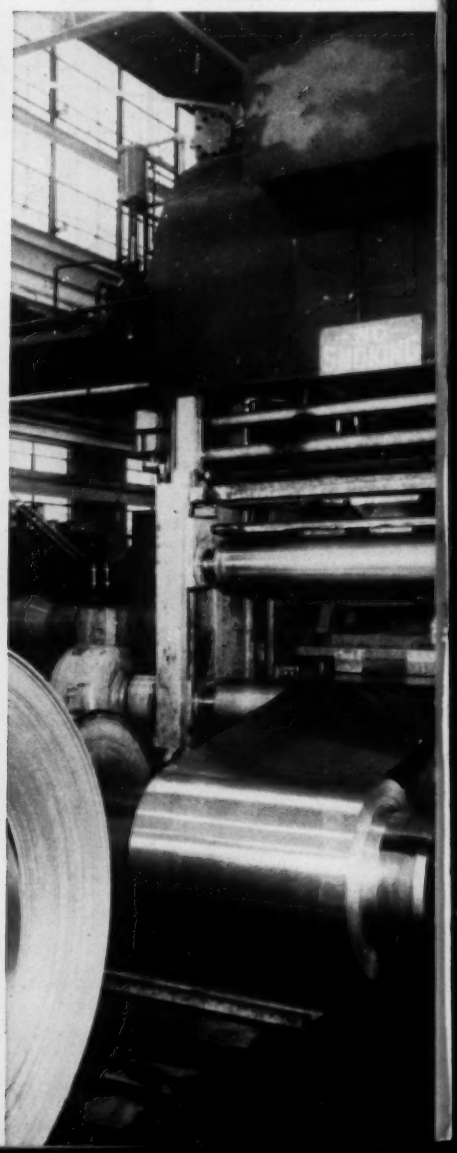
TIMKEN®

tapered roller bearings

9½" AND 33" x 44" COLD FINISH MILL



12" AND 35" x 62" ALUMINUM FINISH MILL



18" AND 45" x 62" ALUMINUM RUNDOWN MILL